

THE IRON AGE

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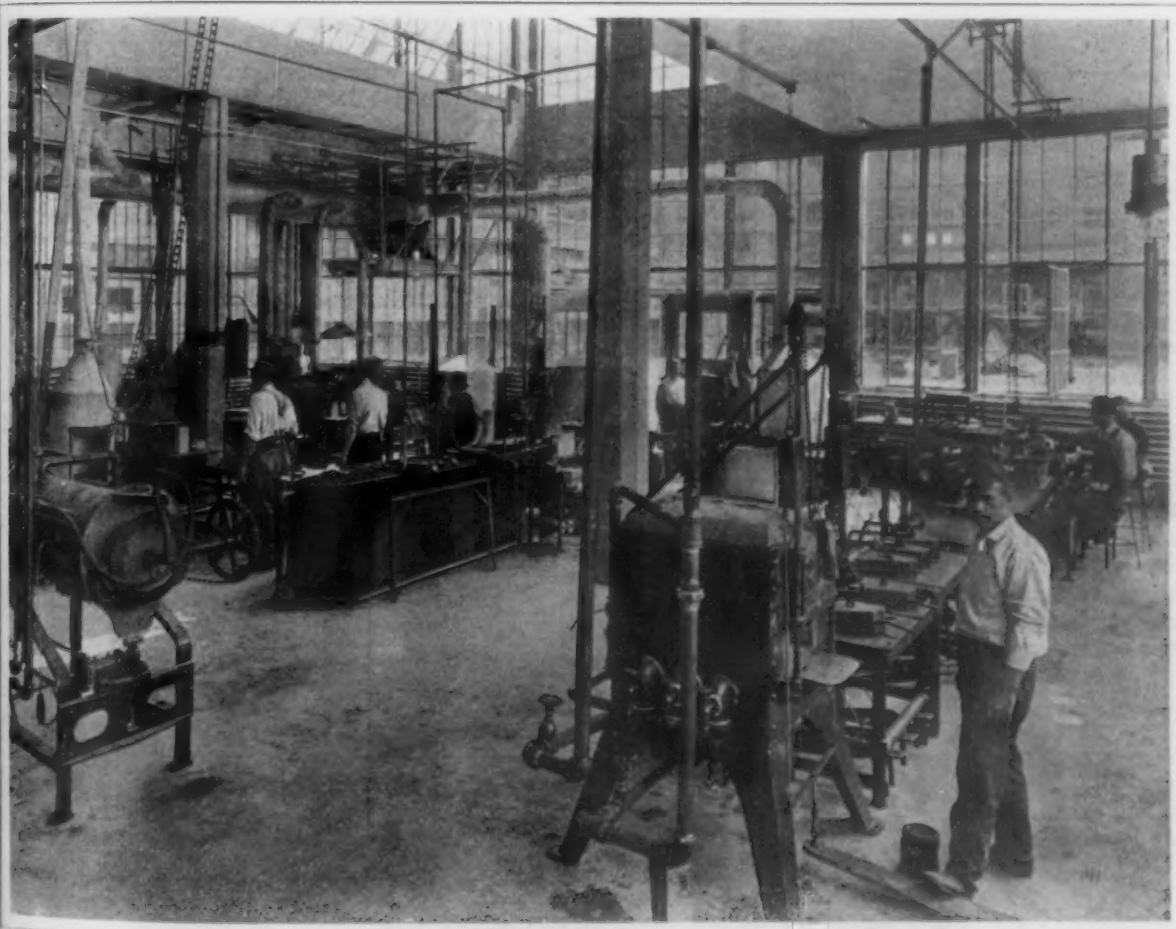
Heat-Treating Plant of Unusual Interest

Burroughs Adding Machine Company Department for Handling Large Numbers of Small Parts
—Use Made of Special Cleaning Machines

An interesting plant for the heat treatment and cleaning of steel parts used in the manufacture of adding machines has recently been built by the Burroughs Adding Machine Company, Detroit, Mich. As there are from 2000 to 3000 metal parts,

250,000 separate parts is heat treated and cleaned, about 100,000 of these being given heat treatment, although the plant has a capacity for handling twice that number of parts.

The two departments are located in a one-story



View Showing Carbonizing Furnace at Extreme Left and Special Presses for Straightening Light Castings at the Right. A Frankfort Furnace Can Be Seen in the Foreground with Cyanide and Lead Hardening Ones in the Background at the Left

Depending on the type, in an adding machine and nearly all of these quite small, the production of the plant requires a very large amount of work in the heat-treating and cleaning departments and a specialized plant to meet particular demands that include in some cases several heat-treating processes for one part, and one in which a very large number of small parts can be heat treated and cleaned economically. In one day an average of approximately

reinforced concrete fireproof building, 55 x 130 ft., with a monitor top 16 ft. wide reaching 8 ft. above the main roof and extending the length of the building. This monitor roof is provided to furnish additional light and to afford good ventilation by allowing the escape of smoke, steam and gases. About 80 per cent. of the outside surface is covered with window space, the windows being in Fenestra steel sash. Hinged sash are provided in the lower win-

dow sections, and all the sash on the sides of the monitor section are hinged. The amount of outside light admitted is so abundant that the glass on the sides exposed to the sun has been painted over to do away with the bright glare when the sun is shining and at the same time leave the rooms well lighted at all times. The building, which is located adjacent to the main factory building, is divided transversely at the center by a brick wall that separates the heat-treating and cleaning departments.

Various types of furnace equipment are provided. Two Brown & Sharpe coal-fired furnaces are used exclusively for annealing and adjoining these is an American Gas Furnace Company's furnace for annealing and carbonizing, the work being packed in boxes in the usual manner. The latter furnace is employed when the carbonizing is to be localized instead of the entire part being heat treated. When the part is to be carbonized all over the gas retort process is used. The furnace used for this work does away with the labor necessary in packing parts in air-tight steel boxes with the usual carbonizing agents and reduces the time required to produce the desired depth of carbonized case. A departure from the usual custom is that carbonizing material is kept in steel barrels with lids instead of in bins. With this care the material is kept clean.

Specially designed straightening presses are used for straightening light castings. Owing to the lightness of some of the castings, especially those used for side frames and ball raceways for paper carriages, a large percentage comes from the foundries somewhat warped and the cost of the castings would be largely increased were the foundries required to furnish castings perfectly straight. These castings are straightened by first being heated to the proper temperature in the Frankfort furnace shown in the foreground at the right of the view of the heat-treating department on page 1115. They are then placed in a straightening press and straightened by either flat weights or dies made in the proper form, depending on the part that is to be straightened. These presses are operated by a treadle actuated by the pressure of the operator's foot.

On one side of the room is located a battery of ten furnaces, seven of these being for carbonizing by the cyanide of potassium process and for lead hardening, one for heating and annealing in barium chloride and one for black oxidizing. Each of these furnaces is covered with a hood to gather the poisonous fumes which are conveyed through a pipe that has an outlet in a larger horizontal pipe that extends under the ceiling, as shown in the illustration.

tion, and discharges the fumes into the outer atmosphere through a stack that extends through the roof. To assure the complete removal of the fumes the ventilating pipes are connected with an exhaust fan located just beneath the outlet stack. So completely are the poisonous fumes removed that with all the furnaces in operation there is a total absence of the cyanide odor in this room.

Every cyanide and lead-hardening furnace is provided with a quenching tank, conveniently located between the furnaces. The parts, when heated, are dropped into wire baskets inside the quenching tanks, the liquid of which is kept cool by running water that is circulated through the outer section of the tanks. In addition to the stationary tanks several quenching tanks are located on trucks for convenience in moving around the plant as needed. As the plant has a cement floor these trucks can be moved about easily.

An interesting feature of the heat-treating department is a standardization of all the work. All parts which require heat treatment of any kind are catalogued in a card index by a symbol number, the card for each symbol or part giving the time and temperature for each operation, instructions as to the nature of the operation and details as to material used. This card index catalogue is kept convenient for reference. When an employee starts a piece of work he refers to the card in the index box bearing the corresponding symbol number to secure data for the operation. The furnaces are connected to recording pyrometers, furnished by the Hoskins Mfg. Company, Detroit, Mich. When a workman starts a job he enters the symbol number and the time he placed the work in the furnace on a blackboard and when he finishes a piece of work he records on this board the time the work is taken from the furnace. Dials are provided above the board, bearing numbers corresponding to the furnace numbers, and the workman sets the hands on one of these dials at the time the work is to be taken off, this dial serving as a reminder of when to remove the heat. At the end of each day a clerk marks the symbol numbers on the pyrometer charts and checks the time shown on each chart with the

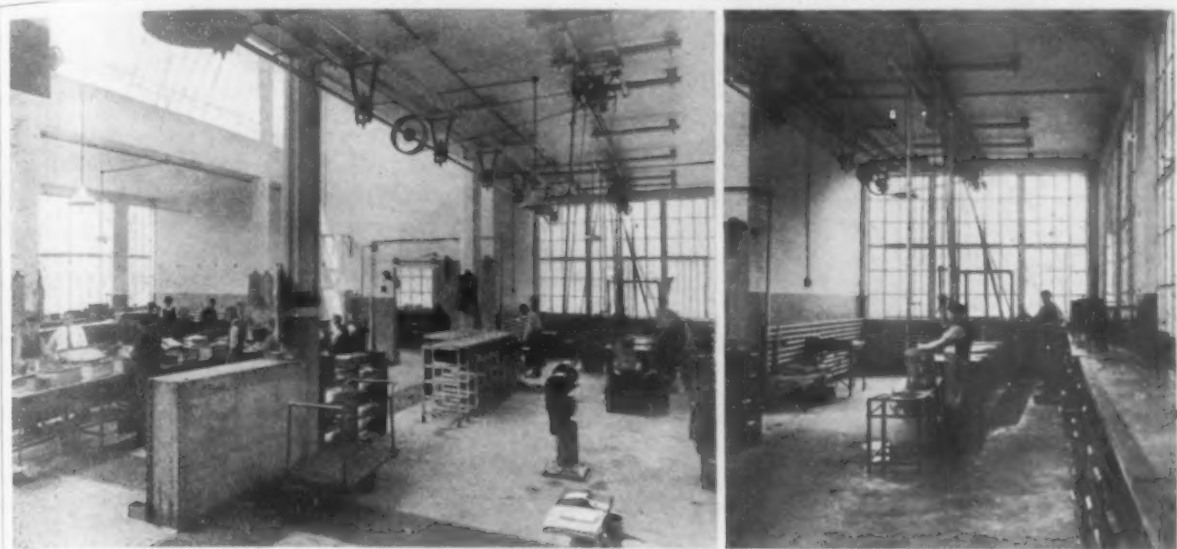
time marked on the blackboard by the workman, and the temperature shown on the chart by the instruction card. Much of the work requires very short heats of 3 minutes or less. In work of this character the recording pyrometer is used only to enable the workman to get the right temperature. He keeps track of the length of time of heating by referring to one minute clocks, several of which are hung about the side walls so that one of these clock dials is al-



A Closer View of Some of the Cyanide and Lead Hardening Furnaces Showing the Discharge Pipes for Conveying the Fumes to the Outside of the Building

ways within the visual range of the workman. As an illustration of the variety of the heat processes that some of the parts are subjected to, take

at the floor level for the escape of gasoline fumes. Sawdust is kept within easy reach in a special device and also cloth bags for smothering fires.



A General View of the Department. Parts Are Being Hand Cleaned at the Left and by Machinery at the Right

One Section Showing the Row of Labor-Saving Cleaning Machines

VIEWS OF THE CLEANING DEPARTMENT

a type bar. The stock used for this bar is low carbon cold-rolled steel with a fair degree of hardness to give stiffness to certain portions. Near the middle of the bar is a hook that has to be case hardened. The hardening is done by the ordinary cyanide of potassium process. One end is then annealed in a special furnace preparatory to a drawing operation. The smallest part that is subjected to heat treatment is a carbon steel pin $\frac{1}{4}$ in. long and $\frac{3}{32}$ in. in diameter. This pin is hardened all over and after the hardening process one end is annealed so that it can be riveted, the annealed portion being $\frac{1}{16}$ in. in diameter and $\frac{3}{32}$ in. in length.

In the cleaning department some of the cleaning must be done by hand with a brush and gasoline. The hand-cleaned parts are first given a rough cleaning in a gasoline vat and a second cleaning in a clean gasoline vat. After being cleaned they are placed in an oven or drier where they are slightly heated, so that moisture will not gather on the metal after it has been cooled by the gasoline, to a temperature lower than that of air. The parts are then dipped in anti-rust oil, and after they are drained they are ready to go to the stockroom.

Very dirty parts, however, are subjected to acid cleaning by machinery. The machine-cleaned parts are first placed in soda kettles to boil out the grease and in many cases they are also given a gasoline bath. After the first cleaning in the soda kettles they are placed in special cleaning machines, one of which operates somewhat like a washing machine. Another has a cage holding the parts that rotates on revolving tables and in another sprays of hot soda water are thrown on the parts by a force pump through small holes in rows of pipe with which the interior of the machine is lined. After being thoroughly cleaned with soda water the parts are given a bath in a kettle containing plain hot water. Then they are dipped in anti-rust oil and go to the drier. After being heated in the drier and drained they are ready for the finished stockroom. Lye is also used in some of the cleaning work. The cleaning machines do the work that would require 15 men were the hand brush-cleaning method followed. Ventilating outlets are provided in the side walls

Employers Always Want New Ideas

At a meeting of the employees of the Art Metal Construction Company recently held in Jamestown, N. Y., about 1300 persons assembled. It was intended to mark the beginning of a new epoch in the relations between the management and the employees. The occasion was the presentation of cash prizes for valuable suggestions offered by employees in the preceding six months. The amounts ran from \$5 up to \$50, and the total paid out was \$175. A special feature of the meeting was an address by E. St. Elmo Lewis, vice-president and general manager of the company. The following is an extract from the address, which indicates the line of thought presented by Mr. Lewis:

So I commend you, my friends, to the thinkers who have made this company what it is. These men have read. They have listened. They have seen. They have felt. They have tried and failed—succeeded—and they have known why. They are the kind of men in the past who made this business big. It was the man with an idea who first started metal furniture as a proposition in this country, and in that day, as it is today, he was laughed at; he was called a fool; his idea was scoffed at; he was ignored, but he had an idea. He knew it was true; he knew it was right; he persevered; he had initiative and he made it go. If the men who started this business had been afraid of change, if they had been afraid of new ideas, if they had ignored new ideas, there would have been no Art Metal Construction Company; there would have been no Fenton Metallic Company, and there would have been no business that you and I serve today. If the men of that day had clung to the old way, if they had been men who were always the last to drop an old thing and never the first to accept a new one, there would have been no business of this kind.

The Tonawanda Iron & Steel Company advises that the report of extensive remodeling of its Niagara furnaces at North Tonawanda, N. Y., is incorrect. The company simply used up its stock of raw materials and then blew out the second Niagara furnace, the first having gone out some months ago. There are no definite plans for putting either in blast again.

The Wisconsin Steel Company is installing at its South Chicago works four 520-hp. vertical Ross boilers built by the Lyons Boiler Works. This battery of boilers is equipped with Foster superheaters and stokers and is also rigged up with burners permitting the use of the battery as a waste heat installation as well as being adapted for coal burning.

TALBOT AND OTHER FURNACES

German Discussion of Dr. Schuster's Report on the Practice at Witkowitz

The important paper by Dr. F. Schuster, of Witkowitz, on the Talbot and other open-hearth processes, which was read before the May meeting of the Iron and Steel Institute, and also the Verein deutsche Eisenhüttenleute, was published practically in full in *The Iron Age*, May 21, 1914. It was discussed very thoroughly by the German metallurgists, a full report being given in *Stahl und Eisen*, June 18, 1914. This discussion brought out many interesting details regarding the open-hearth practice at Witkowitz and other European plants, and is abstracted here.

THE HOESCH PROCESS

Director H. Pottgiesser, of the Dortmund-Union, questioned Dr. Schuster's conclusion that the Talbot process is superior to all other open-hearth processes, and gave particulars regarding the Hoesch process. For the last two years this has been carried out in two 100-ton stationary furnaces. The iron used is basic Bessemer with 1.8 to 2 per cent. phosphorus, and is taken without any pre-refining from a 1000-ton unheated mixer. Three heats of 100 to 110 tons are made per day, 17 to 18 heats per week, corresponding to 1700 to 1800 tons of good ingots in each furnace, using 70 per cent. pig iron in the charge. During April, 1914, a daily average of 298.48 tons of good ingots of excellent quality were produced with not over 0.09 per cent. carbon and 0.02 to 0.03 per cent. phosphorus, for rolling into sheet, rivet rods, strip steel, etc. With pre-refining the daily production would naturally be considerably greater.

During the first period of the Hoesch process about 140 kg. of slag are produced per 100 kg. of ingots, containing 18 to 23 per cent. phosphoric acid; and during the final period about 160 kg. with 5.5 to 11 per cent. phosphoric acid. The slag production is, therefore, about 300 kg. per ton of ingots when using iron with 1.8 to 2 per cent. phosphorus, compared with 187 lb. at Witkowitz, using iron with 1.7 per cent. phosphorus. The 100-ton stationary furnaces are much cheaper to construct than the Talbot furnaces. They burn coke-oven gas according to the Maerz construction, and have no ports, which also brings about a considerable saving. The results, therefore, with the Hoesch process carried out in 100-ton stationary furnaces, using iron without preliminary refining, show that the daily output is greater, the profit from the slag higher, and the furnace construction much cheaper and simpler than with the Talbot process at Witkowitz.

Chief Engineer Fr. Bernhardt, of the Königs-hütte, on the basis of thorough investigations carried out independently, wished to fully support the conclusions reached by Dr. Schuster. His plant consists of a mixer which formerly served the basic Bessemer, two tilting furnaces, one of 300 tons capacity, the other 150 to 200 tons, and two 60-ton stationary furnaces. The latter have been in operation since September, 1912, the 300-ton furnace since July, 1913, and the other furnace since March, 1914. Numerous tests have been carried out to develop the best process of working the pig and ore process. The two tilting furnaces are worked in conjunction, the first for carrying out preliminary refining, and the second for finishing according to the Talbot process. Unlike the practice at Witkowitz, however, the removal of the phosphorus and

other impurities is carried out in the first furnace, so that the second has only to take care of the rest of the decarburization. The main point is, however, that altogether independent tests have led to the same general conclusion, namely, the use of the continuous process, and the tilting furnace. Mr. Bernhardt then goes on to outline the advantages of the tilting furnace, which led to its adoption by his company.

RESULTS WITH WELLMAN FURNACES

A. Klinkenberg, of Dortmund, believed the process as carried out in the Wellman furnace at Witkowitz would have been greatly improved if the original slag had not been allowed to remain in the furnace during the entire working of the heat. The 60-ton furnaces of the Dortmund-Union work by forming first two phosphate slags which are immediately removed. Results are given obtained with these furnaces over a period of about one and a half years. The average output is 230 tons in 24 hr. The heating cost with coke-oven gas at 1 pf. per cubic meter, and blast furnace gas at 0.175 pf. per cubic meter is 3.78 m. per ton (\$0.90); refractory material, dolomite, etc., 1.46 m. per ton (\$0.347); wages, salaries, etc., 1.78 m. per ton (\$0.423). The mixer cost is only a few pfennigs, for the iron is taken from a 1000-ton mixer that also serves the basic Bessemer plant. The output of phosphate-slag, using 100 per cent. basic Bessemer iron with 1.8 per cent. phosphorus, is 20.7 per cent., carrying 18 to 22 per cent. phosphoric acid. From these results it may be seen that in ordinary tilting furnaces under suitable conditions and with proper methods of working, operating costs can be reached that are considerably lower than those at Witkowitz. Dr. Schuster's conclusions, therefore, regarding the Talbot process should be changed to apply to any large capacity tilting furnace, operated in a suitable way. Dr. Schuster replied briefly, and said that their satisfaction with the Talbot process could be judged by the fact that more Talbot furnaces were being built at Witkowitz.

The discussion was continued at Düsseldorf, May 22, Witkowitz being represented by Chief Engineer J. Hofmann, who gave the following reasons for the superiority of the Talbot process over other known pig iron-ore processes:

The production per furnace and day is the largest.

The coal consumption per ton of steel is the smallest. (At Witkowitz the coal used contains 17 per cent. ash, and a great part of the coal used is also 50 per cent. dust and 50 per cent. lump.)

The durability of the furnace is the greatest, no bottom repairs being necessary during the week.

The hearth is not affected by the slag; also the walls and ends stand up much better, so that the consumption of dolomite is the smallest.

The consumption of ferromanganese for the same quantities of steel is the smallest.

The gain from phosphate slag is the highest, because except when the furnace is emptied every two or three weeks, no slag is taken off with the steel. No low value slag is therefore produced.

The wages are lowest with the Talbot furnace, because the same men are used on the furnace and producers as with any other large furnace, but the output is considerably higher.

In reply to a question regarding the life of the furnace he repeated Dr. Schuster's figures, that 800 heats of 65 tons, 52,300 tons, had been tapped without any repairs having been made. The removable port ends were changed twice. The hearth was carefully examined each time the furnace was emptied and found almost untouched. Only one grade of brick was used, the silicon brick made in

the plant. Several changes in construction are being made, and it is hoped to raise the number of heats to 1000, that is 65,000 tons.

Several inquiries regarding quality were answered, and it was stated that the steel was fully as good as that made by other processes, and the fact that less ferromanganese is needed shows that the bath is in good shape, and not over oxidized. Professor Eichhoff was surprised that with slags running so high as 19 per cent. phosphoric acid, no rephosphorization was found. Mr. Hofmann explained that this was because the slags were kept at just the right composition. No trouble is experienced if the iron contents are kept below a certain high limit, but not below a certain low limit, the latter being carefully determined for the Witkowitz conditions.

In regard to the steel, absolutely no aluminum is used in the soft qualities, showing that it is correspondingly quiet. Also no fluorspar is used in working the steel, but notwithstanding the slags are very fluid. This may be due to the walls and hearth not being attacked, no dolomite thereby being thrown into the slag. Finally Mr. Hofmann repeated the statement that no slag is drawn off into the steel ladle, and mentioned that the effort was constantly made to have a small skull left in the bottom of the ladle after pouring. G. B. W.

Shearing Machines for Heavy Plate

Three heavy duty plate shearing machines in which are incorporated the latest improvements and refinements in mill outfits have recently been built by the Cleveland Punch & Shear Works Company for the new Riverside works of the Otis Steel Company, Cleveland, Ohio. The machines are practically identical except in capacity and weight. One is of the cross cut type with a capacity of 84 in. of 1¼-in. plate, and the other two are used for shearing the sides of plates, both handling material up to a maximum width of 156 in., one having sufficient power for stock 1 in. thick and the other shearing material up to ¾ in. in thickness. The weights of the three machines are 140,000, 150,000 and 185,000 lb.

The machines have a gap 36 in. deep in the housings, and all have the same refinements. They are bronze bushed throughout. All gears are steel castings with cut teeth. Steel casting spring hold-down bars are furnished, to be used when desired. When the hold down is not used the operator has an unobscured view across the face of the machine as the top blades are flush with the cover plates.

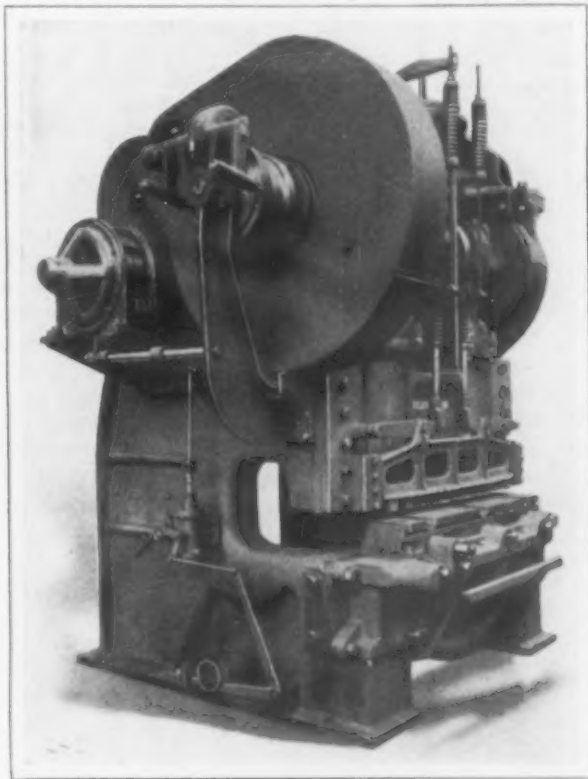
The blades, which are 2 in. thick, are reversible and have four cutting edges. Separate steel L-shaped shear blade seats are furnished to protect the seat of the lower shear block and plunger. The upper blade is bolted directly to the steel casting plunger and the lower blade is bolted to an adjustable steel casting shear block. Through shear bolts, with lugs to prevent them from turning, are used to hold the blades to their respective seats. Through bolts hold the lower shear block to the lower girder.

The cover plates are 43 in. long and are fastened to the housings by through bolts. The guides of the steel casting plunger are provided with bronze taper gibs to take up wear. The housings are designed to give a long bearing to the plunger and still have sufficient opening for the convenient removal of crop ends.

The pitmans are bronze bushed and are long, which is relied upon to insure minimum side thrust. The plungers are counterbalanced by air. The

top girders carrying the air balance cylinders are tongued into the housings and held in place by through bolts. All bolts holding the lower girder to the housings are of the through type.

The automatic clutches are operated by hand



One of Three Recently Completed Shearing Machines for Work in Heavy Plate at a Steel Plant

levers on either side of the machine and a foot treadle across the front of each. A very slight movement or pressure opens the air valve which releases the clutch.

All the gearing is steel with cut teeth, located outside of housings, between a heavy outboard bearing, dowelled and bolted to the housing by through bolts. With this design short, stiff shafts are used, eliminating the long, limber shafts, usually employed, which extend from housing to housing. In no case is a gear or pinion located away from a bearing. All gears are effectively and completely guarded by welded steel guards as shown.

Each machine is driven by a 40-hp. General Electric motor of the slip-ring type, the motor being mounted on the housing and directly connected to the driving shaft through steel gears and pinions.

The Thomas Iron Company expects to blow in this week its No. 8 furnace at Alburdis, Pa. It is a stone stack built in 1869 and was originally 60 ft. high x 16 ft. bosh and 10 ft. hearth. The stone stack is retained in the reconstructed furnace but the company has put in six columns of Bethlehem H beams and a steel mantel that supports a steel bosh jacket. The hearth jacket is used instead of the old brick hearth with steel rails for buckstays. The new dimensions are 60 ft. x 13 ft. bosh and 8 ft. hearth. There are six 4-in. tuyeres. The fuel will be two-thirds anthracite and one-third coke. The ore will be in part from the company's Richard mine and in part local hematite and the output will be about 65 tons a day of Thomas-Vanadium iron. The No. 7 Alburdis furnace has been in blast since September 16.

The report of the American Steel Foundries for the nine months of this year ended September 30 shows a deficit after all deductions of \$75,816.

A Cast Iron with Unusual Structure*

A Description of a Sample That Is Nearly Ideal in Its Crystalline Formation and Excellent in Its Properties

BY K. W. ZIMMERSCHIED

From time to time a number of able articles on the structure and properties of cast iron have appeared treating, collectively, of all the grades and varieties of metal. In the examination of many samples of iron entering into the structure of important automobile parts, the writer has had a good opportunity to test the theories presented in these articles, by applying them to the structures encountered. In the main, these theories are well borne out by the facts in practice; often we encounter cases, however, wherein the hypotheses advanced do not suffice to explain the situation entirely. The purpose of this paper is to present a rather unusual case, in substantiation of published theories, in as untechnical a manner as the subject

There are other products which have similar characteristics, one of which is shown in Fig. 1. This iron is free from combined carbon and has been so slowly cooled that the graphite is present in large plates. It is therefore very much like an annealed malleable casting in the large amount of free iron present but is very different in the condition of the uncombined carbon and this difference is manifested by the much greater brittleness caused by the large graphite plates.

In Figs. 2 and 3 is illustrated an iron containing some combined carbon. Fig. 2 is a sample etched with picric acid and photographed at a magnification of 100 diameters. In it we find a very considerable amount of graphite, which is present in black

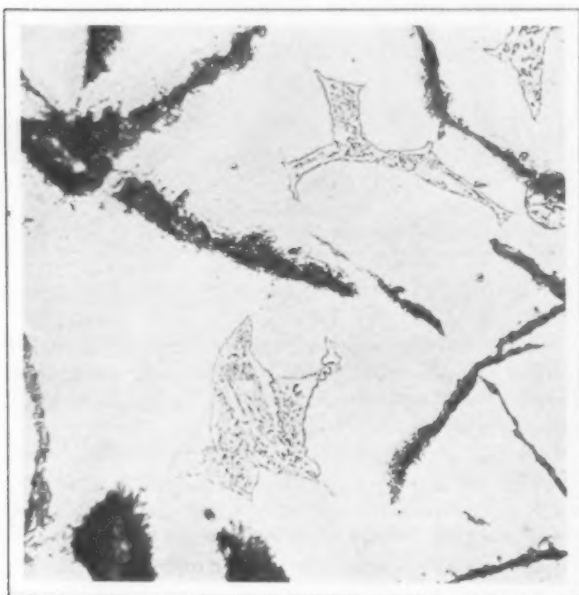


Fig. 1—Iron with Graphite Present in Large Plates, Etched with Picric Acid, 500 Diameters

allows, first sketching as briefly as possible the substance of these theories.

Ever since Prof. Henry M. Howe's presentation of his conceptions, cast iron through its whole range from malleable to white iron has been considered in the light of an extension of the steel series, in which the graphite, when present, plays the role of a large admixture of foreign matter. This steel matrix may, exclusive of the graphite present, be itself either low or high in combined carbon, and may vary within wide limits as to the amount of other elements present. The properties of any good sample of iron will therefore depend upon (1) the properties of the steely matrix, and (2) the physical influences of the substances embedded therein.

In the case of black-heart malleable iron, where all the carbon in the interior of the casting is in the combined form after the annealing processes, the properties of the finished part are very similar to those of a very low carbon steel, as is well known.



Fig. 2—Iron Containing Some Combined Carbon, Etched with Picric Acid, 100 Diameters

curved plates; between these plates we find a large amount of dark material, and surrounding them a considerable amount of a white constituent, which is pure iron or ferrite. The structure of the dark material is better seen in Fig. 3, taken at 500 diameters. It is very likely that the primary graphite plates in this sample were formed by the decomposition of carbide, while the iron was still in a mushy condition, that is, viscous enough to allow the crystals of this element to take their natural form. As the metal cooled, there was additional decomposition of the surrounding metal, which resulted in the formation of pure iron on the one hand and of deposited graphite on the surface of the original plates on the other. It seems that the presence of a small amount of graphite acts as an energizer in the decomposition of additional carbide, which explains the circumstance that the crystals of free iron are very seldom isolated in the middle of the dark areas, but are most often found surrounding the primary graphite crystals.

WHAT THE DARK AREAS CONTAIN

The dark areas consist of eutectic, which is known to metallographists and probably to the most

*From a paper presented at the American Foundrymen Association's convention at Chicago, September 7 to 11, 1914. The author is metallurgical engineer, General Motors Company, Detroit.



Fig. 3—Structure of Dark Material in Fig. 2, Etched with Picric Acid, 500 Diameters

of those who have paid any attention to this study, as pearlite, that is, a constituent which contains about 0.90 per cent. of combined carbon and which occurs in slowly cooled steel. It goes without saying, therefore, that, the higher the pearlite content of an iron or steel, all other things being equal, the higher the tensile strength and the lower the ductility of the metal as a whole. Concerning the causes which underlie the occurrence of these constituents, and the relative amounts of them, it is well known that the balance between silicon on the one hand and sulphur and manganese on the other, taken together with the rate of cooling, exert the greatest influence.

The first effect of increase in the combined carbon is to cause an increase in the amount of pearlite with a corresponding increase in the strength of the iron. When this has progressed to such a point as to give us a structure made up entirely of pearlite and graphite we obtain an iron which is the strongest possible in tensile strength, although it is not necessarily the most resistant to shocks, on account of its greater brittleness. When the amount of silicon is sufficiently reduced, however,

we come into the next stage where the amount of combined carbon rises to such an extent that it exists as carbide in excess of the carbide contained in the structural entity which we have described as pearlite. An example of this condition is given in Figs. 4 and 5, which illustrate an iron containing 2.15 per cent. silicon.

In Fig. 4, taken at 100 diameters from the etched specimen, we find again a considerable amount of white material. In this case, however, it has a very different form from that seen in Figs. 2 and 3 and is very easily distinguished from ferrite in the original sample, owing to the fact that it stands up from the surface in decided relief after polishing. This constituent contains free carbide in excess of the carbon occurring in pearlite and is so hard and brittle that it has an even greater influence upon the brittleness of the iron in which it is embedded than has the graphite with which it is also associated. An examination of Fig. 5, taken at a magnification of 500 diameters, shows how this white, high carbon constituent occurs embedded in the pearlite and also shows the very finely divided condition in which the graphite occurs, the latter being scarcely distinguishable in

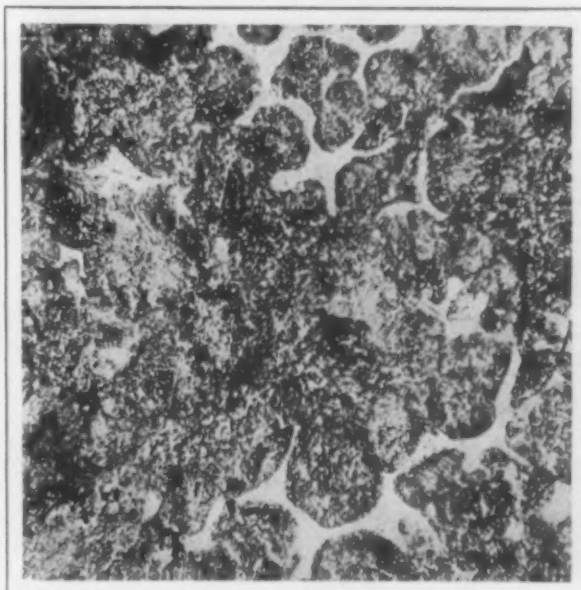


Fig. 5—Structure of the White, High Carbon Portions of Iron Shown in Fig. 4, Etched with Picric Acid, 500 Diameters

its background of pearlite. It happens that the sample pictured here was cast in a thin section and that it is also quite high in phosphorus. These two circumstances have the effect of causing the graphite to be deposited rather late, after the iron has become too stiff to allow the carbon to take its natural form, with the result that it occurs most frequently in such cases, in very small particles.

LIMITS ARE NARROW

From the above examples and discussion it will be seen that the limiting conditions for obtaining an iron of ideal structure cover only a very narrow range. We have met with a number of irons in automobile castings which approximated this structure, but have only one good sample which can be said to consist entirely of pearlite and graphite, with the possible admixture of manganese sulphide. The analysis of this iron is given in the accompanying table; it is seen to run considerably higher in silicon than the iron in Fig. 1 and will therefore, all other things being equal, be expected to run higher in uncombined carbon; the amount of sulphur, however, is also much higher and this element has such a strong influence in holding the

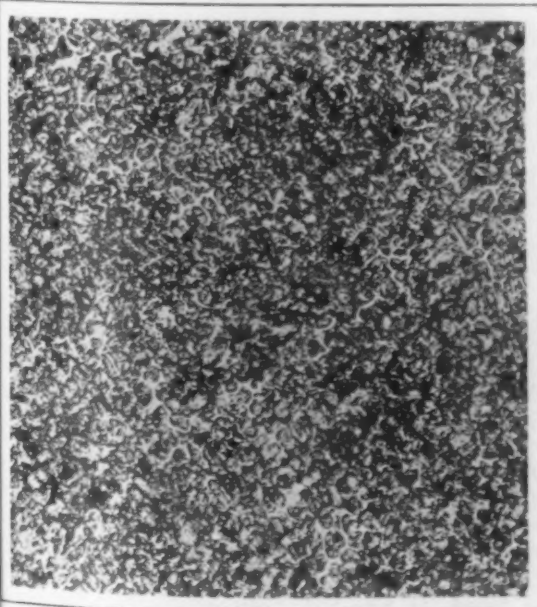


Fig. 4—Iron with Carbide Structure, Etched with Picric Acid, 100 Diameters

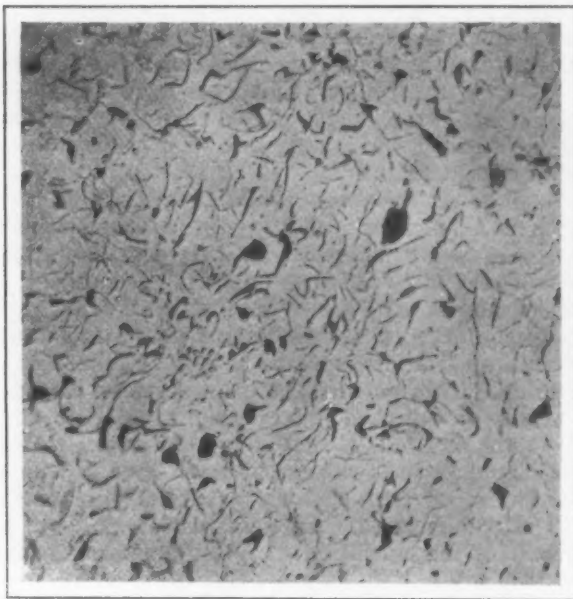


Fig. 6—Center of a 1-Inch Bar, Polished and Magnified 100 Times



Fig. 7—Same Section as Shown in Fig. 6 with Increased Magnification, Polished, 500 Diameters



Fig. 8—Structure of Bar Shown in Figs. 6 and 7, Etched with Picric Acid, 500 Diameters

carbon in the combined form that the effect of the silicon is overcome to the end that the steel matrix is practically "eutectoid."

Fig. 6 illustrates the center of a 1-in. bar, the photograph being taken at a magnification of 100 diameters from the polished but unetched surface of the iron. Fig. 7 is taken at a magnification of 500 diameters, under the same conditions. These two pictures show the medium sized curved plates of graphite and between these we find the globular patches of manganese sulphide in Fig. 7, these being so pronounced on account of the high sulphur content of the iron. In Fig. 8, taken of the etched surface, at a magnification of 500 diameters, we find that the internal structure is made up of the same graphite plates which are prominent in the unetched sample, surrounded entirely by sharply defined lamellar pearlite, without any evidences of ferrite on the one hand or of cementite or free carbide on the other.

STRUCTURE NEAR EDGE OF BAR

Figs. 9 and 10 show the structure of the unetched iron, at 100 and 500 magnifications again,

at a point near the edge. The quicker cooling on the outside has given rise to a characteristic pseudo-crystalline structure, which structure forms a very interesting study by itself. Suffice it to say that at this time, however, we again have graphite in finer plates than occurred in the center of the casting, although the internal structure as given in Fig. 11 is practically the same. In the center of this photograph is a rather large dark area, in which the lines of pearlite are much less distinct than in the lighter portions. A close examination under the microscope, however, reveals the fact that the substance is practically a mass of very fine pearlite, in which is imbedded a considerable amount of rounded graphite. The presence of a very few small areas of free carbide in this photograph can also be attributed to the quicker cooling near the edge which has allowed insufficient time for the establishment of perfect equilibrium.

It will be noted that the combined carbon in this sample is reported as being 0.64 per cent., which is considerably below that generally ascribed as pure pearlite. This circumstance is explained in part by the unavoidable errors which creep into the methods of analyzing a cast iron for combined carbon; since our only methods for determining this constituent are either by analyzing for total carbon, then subtracting from this the result of an analysis

Table Giving Key to Figures and Compositions

Fig.	Etching medium	C. C., per cent.	G. C., per cent.	T. C., per cent.	Mn., per cent.	P., per cent.	S., per cent.	Si., per cent.
1	Picric	Trace	3.52	3.52	0.42	0.409	0.027	2.52
2	Picric	0.25	2.48	2.73	0.52	0.316	0.114	3.12
3	Picric	0.25	2.48	2.73	0.52	0.316	0.114	3.12
4	Picric	0.79	2.48	3.27	0.26	1.221	0.090	2.15
5	Picric	0.79	2.48	3.27	0.26	1.221	0.090	2.15
6	Polished	0.64	2.30	2.94	0.47	0.137	0.136	3.12
7	Polished	0.64	2.30	2.94	0.47	0.137	0.136	3.12
8	Picric	0.64	2.30	2.94	0.47	0.137	0.136	3.12
9	Polished	0.64	2.30	2.94	0.47	0.137	0.136	3.12
10	Polished	0.64	2.30	2.94	0.47	0.137	0.136	3.12
11	Picric	0.64	2.30	2.94	0.47	0.137	0.136	3.12

for graphitic carbon, or else by determining it directly by the color method. In the second place we must deduct from the total weight of iron the amount of other impurities present in order to arrive at the amount of combined carbon which would count for total pearlite in the steel matrix, and third, it has not been established beyond a doubt that total pearlite always consists of exactly 0.90 per cent. carbon.

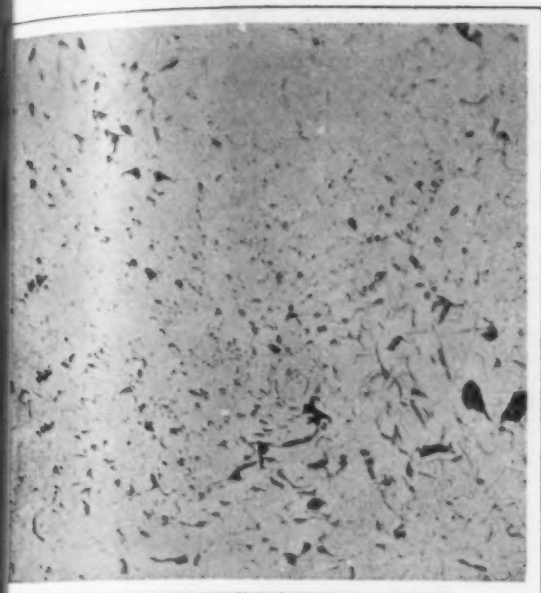


Fig. 9—Structure Near Edge of Bar Shown in Fig. 6, Polished, 100 Diameters

In support of the contention that the increase of pearlite accompanies an increase in strength, we would note that the tensile strength of this iron averaged 42,000 lb. per sq. in. Most of our irons, which approximate the structures shown in Figs. 2 and 3, run between 32,000 and 36,000 lb. per sq. in.

FREE FROM SHRINKAGE

Concerning the question of shrinkage, which will probably occur to the practical foundryman, we might state that this iron is admirable in its freedom from the shrinkage which is liable to occur with many other structures, notably those higher in combined carbon. The graphite is liberated at a time during the solidification when the freezing shrinkage is large, thus counteracting the tendency to sponginess; later on in the cooling, the transformation of combined carbon, which is present in the form of dissolved carbide into the plates of free carbide which form, with ferrite, the matrix of pearlite, causes again a slight expansion which decreases the amount of total shrinkage occurring in the casting.

Nails and Barb Wire in Ireland

Wesley Frost, United States Consul at Cork, Ireland, in Daily Consular and Trade Reports, states under date of October 3:

A large share of the round nails and barb wire used in the Irish Province of Munster have hitherto been brought from Germany and Belgium, and the war has raised prices sufficiently to enable American nails and wire to compete in this market. The imports of nails and screws into all Ireland in 1912 was 7531 tons, valued at \$416,888, and of these it was stated that importations direct from the Continent of Europe were valued at \$115,360.

The price of wire nails before the war varied from \$1.55 to \$1.70 per hundredweight of 112 lb. This was the basis price of No. 7 nails; but the heavy trade here is not only in No. 7, but in Nos. 6 and 5, also. Since the war the prices are by no means uniform, but in general the jobbers and big retailers are being asked from \$2.90 to \$3 per hundredweight. It is said that American nails will be on the market within two or three weeks at \$2.68 per hundredweight. While the shipments from the Düsseldorf region on the lower Rhine have come direct to Cork via Rotterdam and the Belgian nails have also come direct, the contracts have been made through English brokers almost invariably. The same procedure will undoubtedly be followed in sending American nails into this consular district.

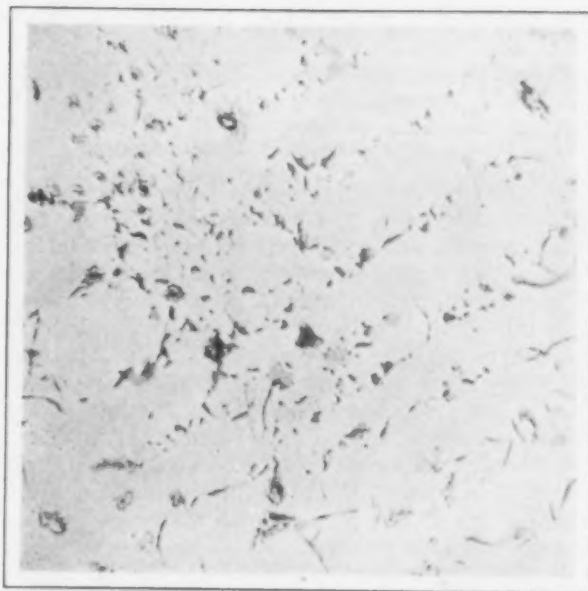


Fig. 10—Structure Near Edge of Bar Shown in Fig. 6, Polished, 500 Diameters

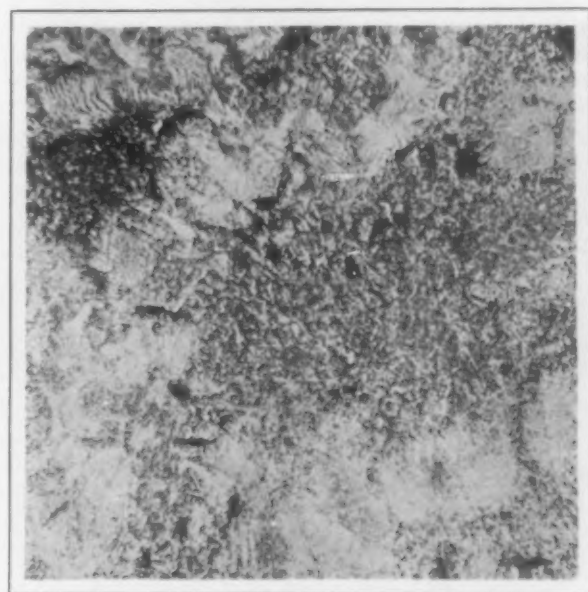


Fig. 11—Internal Structure of Bar Near Edge, Etched with Picric Acid, 500 Diameters

The barb-wire trade is not quite so large; Ireland as a whole imported 5574 tons, valued at \$272,616 in 1912. Prior to the present war the price to Irish wholesale dealers was about \$2.68 per hundredweight, but now \$3.25 per hundredweight is being asked. The price of English barb wire has usually been 15 per cent. higher. American barb wire was once much used here, but yielded to the German product on the score of price, while the English wire has held a fairly good trade, based on intrinsic value.

A New Railroad Spike

The Railway Safety Spike Company, Richmond, Va., has brought out a spike of special shape, covered by patent, which has met with considerable favor among railroad companies. This spike has two projecting wings on the sides of the body to increase its resisting power to the lateral movement of the rail and has notches on the front and back edges below the wings to increase its resistance to an upward pull. It is stated that the resistance to lateral movement is increased more than 300 per cent. The throat is reinforced by additional metal on the back just under the head, giving it added strength when reversed to be used in the slot of an angle bar. These spikes are drop forged. The tests made by railroad companies are stated to have fully borne out the claims of the company.

S. DIESCHER & SONS.
Mechanical and Civil Engineers,

PITTSBURGH, PA.

Lathe Dog with Set Screw Safety Shield

The Armstrong Bros. Tool Company, 339 North Francisco avenue, Chicago, Ill., has placed on the market a lathe dog which is said to combine the convenience and efficiency of the types commonly used with protection for the head of the set screw. This result is secured by covering the head with a special shield, which is relied upon to prevent injury to the workman. The use of this dog, it is emphasized, does away with the necessity for having a special wrench, while at the same time the cap provides extra leverage to enable the set screw to be securely adjusted by hand with ease.

The interior of the cap is shaped to conform to the head of the set screw. In this way, it is pointed out, when the cap is turned for purposes of adjustment the set screw turns with it, the head of the screw merely slipping up or down inside the safety cap.



The Automatic Fireman

Most manufacturing establishments, industrial warehouses and department stores are equipped with an automatic sprinkler apparatus consisting of a system of water pipes fitted at short intervals with sprinkler nozzles which open when the temperature rises much above the ordinary, as in case of an incipient fire. The sprinkler nozzles are closed by plugs of an easily fusible metal alloy which melts at a very low temperature. Cadmium is an essential ingredient of such alloys, other metals used being lead, tin and bismuth. Cadmium is also used in electrical fuses, which prevent fires and accidents by "burning out" when a dangerously high current is accidentally thrown upon a line.

The principal cadmium-producing country is Germany, which in the last few years has had an output between 90,000 and 100,000 lb. annually, sold at 43 to 47 cents a pound. In Germany cadmium is recovered as a by-product in zinc smelting. The United States has annually imported from 4000 to 14,000 lb. of stick cadmium from Germany, but in 1913 the imports dropped to 1656 lb., valued at \$1232. The United States has produced metallic stick cadmium since 1907 and for several years has produced, also, the pigment cadmium-yellow. There are now three American firms making cadmium in one or both of these forms and another year will probably add one more producer.

It was known as long ago as 1886 that cadmium was present in the flue and bag-house dusts of lead smelters treating ores from Leadville, Colo. In zinc concentrates from the Joplin region the ratio of cadmium to zinc is 1 to 162. There is thus a plentiful supply of cadmium in the United States, and only a sufficient demand for the metal is needed for this country to become a great producer.

The United States Geological Survey has just issued a short report on cadmium which may be had by addressing a request to the Director, U. S. Geological Survey, Washington, D. C.

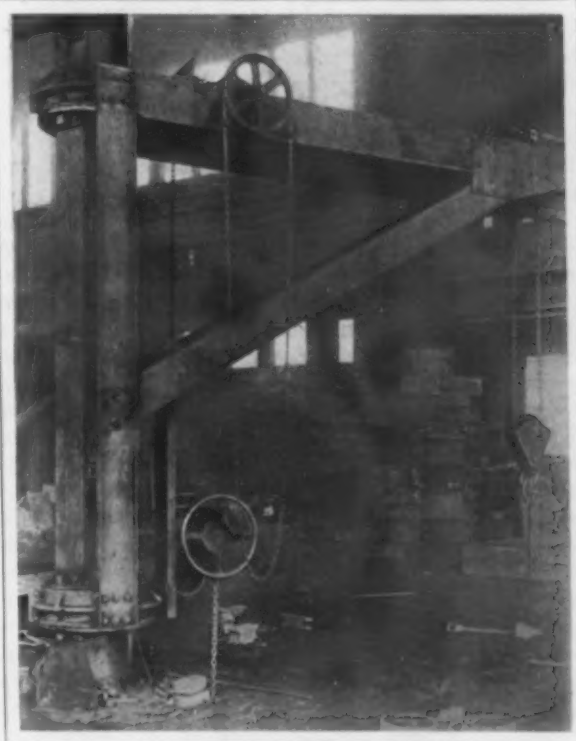
The report of the Moline Plow Company for the 9 months ended July 31 throws an interesting light on the general agricultural implement situation. Gross sales were \$12,748,182 and operating expenses \$11,977,003, leaving net income \$771,009, as compared with \$1,627,865 for the previous year. After the payment of the preferred dividend only \$23,840 was left for the common stock.

The Power Specialty Company, 111 Broadway, New York, superheated steam specialties, has found it necessary to properly handle its business to secure more commodious quarters for its Chicago office and has accordingly removed from the Peoples Gas Building to the Harris Trust Building.

Handling Patterns with a Jib Crane

In the foundry of the Hall Printing Press Company, Dunellen, N. J., an interesting crane constructed of structural steel is employed for handling patterns. The horizontal member, which is 20 ft. long, consists of two 12-in. channels, weighing 20½ lb. per ft., while the inclined member is composed of two 10-in. channels weighing 15 lb. per ft.

The upright portion of the crane is a column of the foundry framing, and around it are bolted two cast-iron pintles to provide a circular support for the crane. A ball race is used on the lower side to take the thrust and to enable the crane to be turned easily. A cast-iron ring, which is made in two pieces, is turned to about the same diameter and is bolted to the upright of the crane. This construction is relied upon to enable the crane to



A Crane Made Almost Entirely of Standard Structural Shapes That Is Employed for Handling Patterns in a Foundry

turn through practically an arc of 360 deg. around the column and thus give an effective working circle having a radius of 20 ft. The main and side floors can be served without changing the load and it is possible for one crane to serve two sections of the side floor, instead of having two outfits. It is stated that when the crane is fully loaded to its capacity, 2 tons, it turns easily, no rack or worm being required to revolve it.

The power for hoisting is supplied by a Yale & Towne triplex block bolted securely to the mast of the crane and operated by hand. A chain hanging beside the trolley controls its operation, thus placing both operations under the control of one man without interfering with the load.

The American Car & Foundry Company announces an expected closing of its plants at St. Louis, Mo., and Madison, Ill., December 1. In this connection, Assistant General Manager Thompson has stated that of the company's 13 plants only two-thirds are now in operation and that most of the work in hand is confined to car repairing. Among the active plants the average operations do not exceed 50 per cent. of capacity.

The Southern Iron and Steel Industry*

Conditions Before and During the Civil War—How Alabama Gained Prominence—Great Progress in Recent Years

BY JAMES BOWRON†

[The paper presented by President Bowron under the title of "The History of the Iron and Steel Industry in the South" was a most creditable production. While the author opened by stating that he had gathered from a number of authorities "the outline" which he presented, it was so enriched not only with personal reminiscence, but also with such keen analysis of conditions and vigorous reference to men and policies, as to make it totally unlike the usually dull narration of events. Its length precludes its presentation in one issue and it will therefore be given in installments.]

Before the war there was no iron and steel industry in the South based upon the manufacture of iron with mineral fuel. The records point to the location throughout the Southern States of small charcoal furnaces to which bloomeries were frequently attached. Some of these furnaces produced only one or two tons per day and the iron was largely worked up by local blacksmiths into horse-shoes, wagon tires and harrow teeth.

In the nature of things, with the growth of population and the development of roads, and more particularly with the construction of railroads, the iron trade began to lose its local character and assume its normal aspect as a national industry. In doing this it met with some legislative discouragements, so that we cannot altogether console ourselves by referring to "the good old days," for we find a plaintive petition presented to the General Assembly of Pennsylvania, November 30, 1785, asking for an additional duty to be laid upon foreign bar iron, was adversely reported by the committee, and not until the adoption of the Morrill tariff, 1861, did this industry obtain a really solid foundation. It is true that the number of establishments multiplied greatly, for prior to the civil war we find a record in the South of no less than 198 furnaces, 217 forges and bloomeries, and 30 rolling mills, the vast majority of which were then passing or about to pass into a condition of "innocuous desuetude."

Some of these plants, however, had been notable ones. Steamboat men can be found to-day on the Mississippi and Ohio rivers who will speak with pride of the boilers made from Hillman's charcoal iron plates produced on the Cumberland River with brown ore, charcoal fuel, and the puddled blooms pounded out by a big trip hammer. Memory suggests that the two negroes handling them under the hammer weighed over 250 lb. each. The success of the Hillman family in this Kentucky enterprise was a material factor in Birmingham developments later on. The charcoal furnaces from Rome, Ga., to Selma, Ala., established a reputation for car-wheel iron, the low-silicon cold-blast charcoal pig being soft at the hub, easily turned, but taking a deep chill. Among those producers one notices the rise of the Noble family at Anniston into affluence, laying the foundation for the future success and development of that city.

PERIOD OF THE CIVIL WAR

As a traveler passes by railroad train through a tunnel from one landscape to another in a differ-

ent valley, so we pass through the period of the civil war. Enterprise throughout the South was necessarily almost stopped. Here and there a plant was maintained for the purpose of furnishing warlike supplies—cannon, shot, and swords; but more important still perhaps for military purposes were locomotives, wheels, rails, nails and bar iron. Establishments within range of Federal gunboats upon the rivers in some cases were injured or destroyed; in others, abandoned for the time. The organizations of peace were broken up, some plants taken by the Federal Government and operated for its own benefit, including the coal mines which later became the foundation of the Tennessee Coal, Iron & Railroad Company. Suffice it in a paragraph to say that this was, as all war times are, a period not of construction, but of destruction.

It is interesting to read how during this period shot and shells up to 180 lb. weight were cast for the Confederate Government at Natchez, Miss., and later at Columbiana, Ala., the plant being burned in Wilson's raid of 1865. Guns were manufactured 10 to 18 ft. in length, and from 2 to 3 ft. in diameter through the breech, cast and strengthened with wrought-iron bands. Armor produced here for Confederate gunboats was in the shape of narrow thick strips, usually 2 x 6 or 3 x 6 in., and as much as 10 ft. in length. Admiral Farragut said after the fight in Mobile Bay concerning the Confederate steamer Tennessee that he poured the "whole broadside (of the Hartford) of 9-in. solid shot within 10 ft., and not a shot entered the vessel." This certainly speaks well for the quality of the iron manufactured.

With the destruction of the older plants came the dawn of new things. Although Miss Armes in her book, "The Story of Coal and Iron in Alabama," says, speaking of the fall of Selma, "Beyond that burning city smoke the ruins of Oxmoor, Irondale, Tannehill, Brierfield, Shelby, and the rest, the coal and iron business of Alabama quieted now it seemed forever," a resurrection day was coming very fast.

It is true that warm blast and higher pressures were being applied to charcoal furnaces, that the yield was steadily coming up and cost coming down, and the day was approaching when the enterprise of James C. Warner and L. S. Goodrich led to the construction of the largest charcoal furnaces yet known in the South, with kilns for the production of charcoal and the recovery of wood alcohol, but the days of the charcoal industry were fading fast and these efforts came too late.

THE COMING OF BESSEMER STEEL AND COKE

In 1864 the first Bessemer steel was blown in this country, and in 1867 3000 tons of Bessemer

*Presented before the American Iron and Steel Institute, Birmingham, Ala., October 30, 1914.

†President Gulf States Steel Company, Birmingham, Ala.

ingots were produced; 1872, 120,000 tons; 1877, 600,000 tons, and 1882, 1,696,000 tons. As coming events cast their shadow before, it was increasingly evident that steel was about to displace charcoal iron, and the doom of many a small decadent Southern furnace, bloomary and rolling mill was already apparent. About this time a new factor was introduced, mineral fuel in the shape of coke, and a new era commenced.

Becoming convinced that the red powder on Montevallo road was iron ore, Mr. Grace, later sheriff of Jefferson County, owner of a farm at Grace's Gap, sent a wagon load of the ore to a forge in Bibb County, where it was made into wrought iron. He made the first iron from Red Mountain ore in 1862 from what is now the Ishkooda property of the Tennessee Coal, Iron & Railroad Company. The purchasers were F. Gilmer and John T. Milner, who with aid from the Confederate Government established Oxmoor furnace and in later years purchased hundreds of acres for Samuel Thomas, of Catasauqua, Pa. This formed the nucleus for the holdings of the Republic Iron & Steel Company in Alabama.

In 1863 Daniel Hillman, who had made a handsome fortune from his Kentucky operations, visited the spot and invested in lands. These were afterward opened by his son, T. T. Hillman, for account of the Alice Furnace Company of Birmingham, in 1879, which began with an output of 53 tons per day; but this is anticipating. Toward 1870 plans were laid to rebuild the furnace at Oxmoor, accomplished in 1872, and at this point the financial assistance was obtained of Daniel Pratt, the cotton magnate, and his son-in-law, H. F. DeBardelben, who was to become so active a figure in Southern development. The furnace went into blast in the winter of 1873.

A SETBACK BY PANIC OF 1873

At that time the South & North Railroad, now the Louisville & Nashville Railroad Company, had not succeeded in completing its road, a 66-mile gap remaining unfinished between Decatur and Birmingham. There seemed great doubt as to whether money could be raised to complete this, and whether the road finally completed with the assistance of \$2,200,000 from the State of Alabama would become only a feeder to the Alabama & Chattanooga; but after much negotiation the enterprise was completed and opened just as the panic of 1873 broke upon the country. The Oxmoor furnace could not get out more than 10 tons per day. The price of iron fell from \$40 to \$8. The plant was shut down and cholera swept over the district. Again it might seem as though the iron industry in the South was doomed.

In the autumn of 1873 the Eureka Company was formed which employed L. S. Goodrich as superintendent. He reduced the fuel consumption from 96 bushels of charcoal to 123, and increased the output of the furnace from 8 tons per day to 18; and in the following year he proposed the use of coke instead of charcoal. After the lapse of some time, during which the officers of the company, swamped with debt, offered to turn over their furnaces to anyone who could handle them successfully, a meeting of citizens of the infant city of Birmingham raised an experimental fund, and five coke ovens were built.

Miss Ames graphically says: "Affairs on the North & South Railroad were in sorry shape. There was neither coal, iron nor lumber for the road to carry; neither were there passengers, for nobody ever went anywhere in Alabama in those days. Be-

tween Decatur and Calera there was not enough traffic to warrant the operation of a passenger coach once a week, nor to operate more than one freight car a day. There was no revenue from any source. The experiment of making iron with coke seemed to every man in the district the last straw. Every eye was turned to Oxmoor. If it were unsuccessful, then the South & North Railroad must be forever abandoned in Alabama."

On February 28, 1876, the first coke pig iron was made in Alabama. As a result Louisville and Cincinnati interests, including the well-known names of Guthrie, Sloss and Sinton, became associated with the property. In 1876 and 1877 the furnaces were rebuilt 50 ft. in height, making 20 to 25 tons each. And now set in a general era of development of coke-using hot-blast furnaces. New York capital constructed Rising Fawn furnace in Dade County, Georgia, the first blast furnace in America to which Whitwell hot-blast stoves were attached, the first departure from the old system of cast-iron pipe stoves. My friend Thomas Whitwell—at whose Thornaby furnace, about 1860, I saw gas taken off by a down-comer rising out of the center, while top fillers dumped barrows into the open hopper around it—was deeply impressed with the possibilities of the American iron trade, and in addition to establishing an agency for his stoves he assumed the leadership in an enterprise known as the Southern States Coal, Iron & Land Company. With English capital the company built two furnaces in South Pittsburg, Tenn., for the purpose of combining with navigable water the coke and coals of Cumberland Mountain and local red ores and brown ores of East Tennessee. The first of these furnaces was blown in in May, 1879, having been constructed on English designs and erected and operated by English experts sent out for the purpose. It commenced with 45 tons per day output and crept up to about 70 tons under the management of my energetic colleague, E. C. Pechin. The furnaces were 70 ft. high, 18 ft. bosh, and $3\frac{1}{2}$ lb. pressure of blast heated to 1300 deg.

This was by no means, however, the first development in coke-made pig iron in Tennessee, for a short blast had been made experimentally in 1859 in a furnace afterward used by the Union troops as a lime kiln. The first furnace actually built on a commercial scale for coke fuel in Tennessee, or in the South at large, was that at Rockwood, Tenn., in 1867, of which Capt. H. S. Chamberlain, of Chattanooga, was the leading spirit. This plant has always been successful and active, and is so to-day.

The successful manufacture of pig iron with coke at Oxmoor naturally led to developments on a constantly broadening scale. The next few years witnessed the construction of the Sloss furnace in Birmingham; and the Birmingham Rolling Mill Company, a Louisville enterprise, taking root in 1879 for the manufacture of bars, sheets and plates. These were followed by the location of the Woodward Iron Company furnaces, established by Wheeling, W. Va., capital in 1881, which commenced operation in 1883.

PREDICTIONS AND RESULTS A GENERATION AGO

About this time the well-known statistician, Robert P. Porter, director of the eleventh census, and interested in the New York Press, visited the district and gathered several interesting remarks and prophecies. Mr. Porter quotes among others the late Abram S. Hewitt, who said, "This region of Alabama . . . is the only place on the American Continent where it is possible to make iron in competition with the cheap iron of England. The

cheapest place until now on the globe is the Cleveland region, Yorkshire, England. The distance from the coal to the ore averages over 20 miles, while in Alabama the coal and the ore are in many places within half a mile of each other. I think this will become the region of coke-made iron on a grander scale than has ever been witnessed." Isaac Lowthian Bell (afterward Sir), a world-wide authority, said: "I will not say that Birmingham will furnish the world with iron, but I will say that she will eventually dictate to the world what the price of iron shall be." Mr. Porter, however, after quoting these two, and having selected Oxmoor as the cheapest possible point of production, says Willard Warner, former United States Senator, and experienced iron manufacturer, "admitted . . . that there had been more capital sunk in Alabama than there had been dividends paid in the iron industry since the war." Samuel Noble, of Anniston, said: "You can go into the history of iron making in Alabama for the past 12 years and find it strewn with the wrecks of shattered hopes. In Georgia, if there is a single furnace in the State that for the past 12 years has not sunk the original owners all the money they put in, and not changed hands, I do not know it. Those of Tennessee have not fared much better. . . . The great trouble is we have not a home market. The whole State of Alabama cannot take the product of a single blast furnace for a month. The men who have gone into the iron business with a hope of making iron cheaper than England, and making nothing else, have lost their money."

About this time a remarkable real estate speculation developed throughout the South, which for some unknown reason was largely predicated upon the iron trade, and more particularly on the blast-furnace department. Extraordinary scenes occurred of auction sales of lots, in forests of scrub pine, or even in bottom farm lands subject to overflow. Trains of Pullman cars were side-tracked bearing hundreds of eager bidders, largely prosperous Eastern business men who were willing to bid hundreds of dollars per front foot on the promise of a blast furnace at that point, although the lands had previously been worth a very few dollars per acre. Numerous furnaces were built in pursuance of this remarkable craze. In two instances, at Fort Payne, Ala., and Middlesborough, Ky., open-hearth steel plants were built at the same time.

NECESSITY ENFORCED IMPROVED METHODS

The multiplication of blast furnaces caused the inevitable result of bringing down the selling price of Southern pig iron so low as to be largely unprofitable, and it began to be the study of each producer how he could reduce costs. This led to the building of larger furnaces and more careful preparation of the stock and harder blowing, and 200 tons per furnace per day became the ideal to be attained.

This was accompanied by efforts to improve the quality of the fuel and reduce the consumption of coke and limestone. Various types of coal washers were introduced, including the Stutz, the Robinson-Ramsay, the Stewart, and others. The South took early part in experiments in the interest of economy and improvement, utilization of waste heat from coke ovens being effected by myself in 1879 at Victoria, Tenn., in raising steam for the firebrick works at that point, and by carrying the exhaust steam under the drying floor of the brick works. Some effort was also made to reduce the cost of brick for coke-oven lining and the backing of blast furnaces by manufacturing them from local material in the Chattanooga district. A fair coke oven brick was made, but the clay bricks were not satisfactory

owing to the large amount of combined water in the kaolin clay and the consequent shrinkage. The application of waste coke-oven heat went ahead still more extensively under Erskine Ramsay at the Pratt Mines near Birmingham, and Charles E. Bowron at Tracy City, Tenn., where all coal mine haulage from drift mines, operations at the tipples, distribution of coal to the ovens, and pumping of water were accomplished by this agency.

In developing these plans of cheaper and larger output the district began to gain outside skilled operators, evidenced when in addition to the companies already named the Thomas family of Catsauqua, Pa., developed the Pioneer Mining & Mfg. Company near Birmingham, and gradually the Birmingham district became a hive of industry. Under the stress of competition, however, other furnaces and mills standing alone with old plants and equipment became obsolete and dropped either into the hands of their creditors or into idleness, and then disappeared from active competition. It is needless to compile a list of these tragedies in which many hopes were buried. It is kinder to draw a veil of oblivion and obscurity over them.

(To Be Continued)

Wickwire Company to Build Steel Plant

For the purpose of plant extension the Wickwire Steel Company, Tonawanda, N. Y., has filed a first mortgage covering \$2,500,000 6 per cent. 20 year gold bonds against its blast-furnace plant and property, and including 3400 shares of the Wickwire Mining Company of Michigan, which operates the company's ore properties. With the proceeds of the mortgage, which was placed with the Bankers' Trust Company, New York, to secure the bonds, it is the intention of the Wickwire Company to build a plant for the manufacture of steel billets, rods and wire, and in addition provide funds to enable the company to enter into a part ownership of a by-product coking plant which it is understood will be erected by the Semet-Solvay Company of Syracuse, N. Y. The Wickwire Company will be a large user of the fuel and gas produced by the coke plant.

It is expected that construction work on the steel plant and coke ovens will be commenced sometime in the coming year, but no definite announcement has been made on this point. The papers filed in the Erie County clerk's office show that \$1,500,000 of the mortgage is being advanced at this time. The date of issue of the mortgage bonds is November 1, 1914, and they will mature November 1, 1934. Provision is made for retirement, if desired, after November 1, 1917, at a premium of 2½ per cent.

Rules for the Engine Room

It comes to *The Iron Age* that the following rules have been posted in the engine room of the Globe Iron Company, Jackson, Ohio:

1. When you enter the engine room spit on the floor; we have water, lye, soap, mops and brushes and will clean up as soon as you leave.
2. Rub your hands on all the polished work; it will give some one work and use the surplus polish.
3. Put your hand on the engine's bright work; you will then know if it is smooth, hot or cold. Tell others to do the same.
4. Stay in the engine room as long as you please. The engineer has nothing to do but entertain visitors.
5. Be sure to tell the engineer if his engine is pounding or running right; as he will not know it unless you do. He will stop and make repairs while you wait.
6. Don't tell the engineer who you are; he is a mind reader and always knows you. Go anywhere in the engine room and you will please him.
7. Advise him what to do, as you know best; the engineer is there only every day and does not have a chance to see as much as you will in an hour.
8. If the engineer is busy making repairs, tell him a good story you heard the other day and if possible get in his way.
9. Be sure and tell all you know; it won't take long.
10. Call again and repeat as above.

The Crucible Steel Company's Report

The fourteenth annual report of the Crucible Steel Company of America, Pittsburgh, has been issued, covering the fiscal year ended August 31, 1914. The profit and loss account is as follows:

Gross profits	\$2,991,602.02
Repairs and depreciation	\$1,316,322.41
Interest on scrip and bonds of subsidiary companies	609,485.91
Contingencies for accidents, etc.	50,754.57
	<u>1,976,562.89</u>

Net profits

The net profits of \$1,015,039.13, applicable to dividends, as shown above, show a decline from the previous year of \$3,800,000. The undivided surplus, after the payment of the full year's preferred dividend of 7 per cent., is \$7,371,201.67. In referring to the large falling off in profits for the year ended August 31, 1914, as compared with the previous year, the following statement is made:

Earnings during the year suffered much from the depression and stagnation of general business at home and from the recent complete cessation of export shipments and payments abroad. It is felt reasonable to assume that, with improved conditions due to the excellent crops at home, and a fair freight-rate allowance given to the railroads by the Government, a restoration of normal business should soon follow.

Every effort is being made to extend the distribution of the products of the company in new directions, and to manufacture new lines previously supplied from the Continent, not only because of present foreign curtailment occasioned by the war, but also through a desire to maintain our manufacturing activities to the highest point possible and to lessen the number of unemployed and the distress incident thereto.

The entire direct loss of foreign business, which to this company was large, and also indirectly our domestic business through foreign influence, naturally affects our general income, our customers at home being unable to export their goods, thus decreasing their consumptive power of our products.

The balance sheet, as of August 31, 1914, is as follows:

Assets	
Plant, equipment, good will, etc.	\$45,385,609.49
Investments in and advances to associated companies	8,167,291.17
Other investments	200,100.00
Inventories	6,891,199.11
Taxes and insurance unexpired, etc.	70,107.58
Bills receivable	91,449.52
Accounts receivable (less reserve)	2,569,383.73
Cash	1,286,269.78
Total	<u>\$64,662,210.38</u>
Liabilities	
Preferred stock	\$25,000,000.00
Common stock	24,578,400.00
Dividend scrip due June 30, 1920	2,033,845.00
Coal land purchase notes	902,000.00
Bills payable to banks	2,655,000.00
Accounts payable	980,903.10
Interest and taxes accrued	68,775.00
Depreciation and plant renewal fund	802,816.74
Fire insurance	219,268.87
Contingent	50,000.00
Surplus August 31, 1913	\$8,106,162.54
Net profits year ended August 31, 1914	1,015,039.13
Deduct—Dividends on preferred stock	1,750,000.00
	<u>7,371,201.67</u>
Total	<u>\$64,662,210.38</u>

At August 31, 1914, the unpaid dividends accumulated on the preferred stock aggregated 17½ per cent.

Improvements now under way or made during the year at the different plants of the company are set forth in detail in the report. Regarding the Pittsburgh Crucible Steel Company, it is stated that the finishing mills are being gradually put in place, so that by January 1, 1915, it is hoped that everything will be in such a completed state that the plant can begin soon thereafter to produce results. As to the Syracuse Crucible Steel Company, it is stated that the construction of the new plant, so far as its buildings are concerned, is practically finished. Nothing has yet been done toward the installation of machinery because of present uncertain business conditions prevailing throughout the country.

The report is signed by Herbert DuPuy, chairman of the Executive Committee, and C. C. Ramsey, president.

The German Iron Trade in Recent Weeks

From the last issues of the London Iron and Coal Trades Review and the Ironmonger, the following is taken based on statements in German publications:

The application to the German Government to give the iron and steel industries more employment by the starting of all kinds of public works has had some result. Authorities have been recommended to continue all new construction in hand and to start the execution of new work. The iron trade will profit by the requirements of the engineering workshops of the railroads for building materials and tools, locomotives, cars, etc. There is also a slight improvement in private inquiries. The September orders for pig iron, as well as for some qualities of finished products, were better, but business in semi-finished steel remains very quiet. Consumers who used to purchase British pig, have now been compelled to buy from German works. The disappearance of British customers is, however, greatly felt by the manufacturers, and, in addition, inland consumers have been reserved, which is partly attributed to the increase in prices. Steel bar makers are somewhat better off, as they have profited by the higher prices ruling in the South German markets, and have received some orders from that district. Wire was for a time in strong demand for army purposes, but the business is now quieter, and the dissolution of the Association of Wire Manufacturers has not improved the position. The market for tubes has become even weaker, the conditions before the war being anything but satisfactory. The demand is limited to military requirements; for private consumers it is so poor that the most severe competition has resulted.

The position of the market for iron ore is not clear. The mines in Luxemburg in some cases have resumed operations, but there is no particular demand, the iron works still having sufficient iron ore in stock to cover immediate requirements.

The situation in Upper Silesia has not shown any great change. Railroad traffic is not yet restored, and it is thus impossible to guarantee regular supplies. There has been, however, a considerable improvement since the beginning of the war, while there is also more confidence in the trade.

A committee appointed by the Association of German Iron and Steel Foundries, at a meeting on September 25, decided on the following resolution: It is fully recognized by the committee that the present conditions of the trade are such that it is compelled to raise the prices of the foundry products. It is, however, the best policy to leave to the particular branches the fixing of the increase in accordance with local conditions. The committee is in complete agreement that no forward contracts can be made for the delivery of foundry products in 1915. The Niederschlesisch-Sachsische Huttenverein has already made a start by raising prices by 10 per cent., and the Hesse-Nassau Foundry Association has followed this example by an increase of 5 per cent., while the Kesselöfen-Verkaufsverein has advanced prices by 15s. per ton.

A meeting of the German Spelter Syndicate has been held at Berlin to consider the situation created by the war and future prices. The German spelter market is suffering severely and stocks at the works are heavily accumulating, exports to England and Russia, the principal foreign buyers of German spelter, having come to a standstill while the deliveries to neutral countries are very small. The reports of an impending dissolution of the International Syndicate are premature.

The order of the Minister of Commerce prohibiting the export of malleable iron in bars, blooms, sheet bars, billets, and crucible steel in blooms applies only to special irons and steels. In doubtful cases the customs authorities may require proof that the material sent for export is not special iron or steel.

The Mannesmann Tube Works is now working on an average at about one-third of capacity. The mills are partly working for stock, to prevent dismissing more men. The contracts are partly for naval and military requirements and partly private orders from Germany and neutral countries.

ESTABLISHED 1855

THE IRON AGE

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A Hypothetical Opinion

Imagine, if you can, the President of the United States addressing the Attorney General as follows:

I am sending the inclosed papers, submitted to me by the Secretary of Labor, in order to ascertain whether in your opinion the proposed "Industrial Co-operative Benevolent Movement" may be lawfully formed. I know that it is contrary to the practice of the department to give opinions beforehand as to contemplated transactions, and I think that such opinions ought never under ordinary circumstances to be given, but circumstances with regard to the conduct of the great iron and steel industry which have been created by the new tariff and the European war are most extraordinary and seem to justify extraordinary action. It is for that reason that I venture to ask you to depart in this case from the usual practice of your department. It occurs to me that the "movement" contemplated stands in a class by itself. It is hardly conceivable that such arrangements should become settled practices or furnish precedents which would be followed in the regular course of business or under ordinary conditions. They are as exceptional in their nature as the circumstances they are meant to deal with and can hardly be looked upon as, by possibility even, dangerous precedents. It is for this reason that I feel the more justified in asking you your opinion in the premises.

Imagine, also, if you can, the Attorney General replying as follows:

I have the honor to reply to your request for my opinion as to whether the Federal anti-trust laws (the so-called Sherman act, the so-called Clayton act and the Trade Commission act) would be violated in any respect by the carrying out of a plan which has been devised for alleviating the lamentable condition into which our iron and steel industries have fallen. The markets which take annually about \$1,500,000,000 worth of iron and steel are now almost completely demoralized. Trade in some branches of the iron and steel industry has virtually come to a complete stop and in others has been seriously hindered. Financial conditions contingent upon the wholesome conduct of the iron and steel trade have been badly deranged. In consequence of these extraordinary conditions it has been impossible to obtain in the usual way the large volume of orders required to keep our blast furnaces, steel works and rolling mills in operation so as to employ the usual large number of workmen dependent upon these industries.

To meet this situation the plan in question has been proposed. It contemplates the formation of a syndicate composed of manufacturers of iron and steel who will from time to time meet for the purpose of exchanging views on the situation and endeavoring by the imparting of trade information to one another to avoid disastrous competition in the pursuit of business and thus prevent possible bankruptcy of important producing interests which would undoubtedly result in throwing out of employment still greater numbers of workmen and thus augment the distress now prevailing in our manufacturing centers. Nothing in the nature

of price-fixing, restriction of production, division of territory or control of markets is involved. The members of the syndicate will be perfectly free to make contracts in any amount to any person and on any lawful terms. Buyers will be under no restraint whatever as to the price at which they may be able to purchase their requirements in iron or steel. Nor will their free agency in buying or not buying as they see fit and from whom they see fit in any manner be restricted. In short, the plan simply provides the necessary moral stamina which will enable a manufacturer to avoid the reduction of his price below the level necessary to enable him to make both ends meet and to pay his workmen fair wages for the service performed, thus avoiding sacrifice sales for the purpose of raising needed funds. I am unable to see how such a plan could be thought to fall within the purview of the anti-trust laws.

Imagine further, if you can, that the Attorney General who would write such an opinion might be Jacob M. Dickinson, now the special counsel for the United States engaged in the prosecution of the United States Steel Corporation.

In view of the remarkable decision just rendered by Attorney General T. W. Gregory in relation to the cotton syndicate, such an opinion should not be regarded as wholly without the pale of reason. The "movement" would not require the Government to lend its credit in any way for the benefit of the iron and steel manufacturers, but they would simply be permitted to handle sensibly the extraordinary conditions which now prevail in the iron and steel trades. They would depend upon themselves as they have done heretofore—working out their own salvation. They would be wholly unlike the farmers and planters, of whom Vice-President W. L. Sanford, of the Roberts, Sanford & Taylor Company, Sherman, Texas, said in a circular dated October 8, 1914, "As a class they have been pampered and humored and petted by politicians, office-seekers, retail merchants and banks until they have come to think that all these things are theirs by divine right."

Factors in the Business Situation

We referred a week ago to certain facts which seemed to indicate that a turning point in the iron and steel market was not far off. At that time particular stress was laid upon what might be termed the technical position of that market itself, in that the rate of buying of steel products had dropped to a rate below that of actual consumption, stocks in buyers' hands being drawn upon, and such a condition could not continue for any length of time. As no very great improvement could be ex-

pected until the situation should be helped by improved circumstances without the trade, the good crops and the new banking system were referred to in that connection.

In pursuance of this subject some significant references can be made. Our foreign trade balance has become quite favorable again. A preliminary estimate of the October movement just made by the Department of Commerce indicates that the total movement in October will prove to be about \$140,000,000 of imports and \$200,000,000 of exports, showing a favorable trade balance of \$60,000,000. In September the favorable trade balance had been \$17,000,000, while in August the balance was unfavorable by \$19,000,000 and in July by \$6,000,000. The net favorable balance for nine months was \$58,000,000, while October alone, if the estimate is close, may show a larger favorable balance than that entire period.

The results of last week's elections may be regarded as favorable to business, in that the leading parties seem both to be well satisfied. While to many the election result means disapproval of some of the legislation enacted in the past 18 months, there are few business men who would like to see all the acts of the present Congress undone. An era of legislative inaction and consequent good feeling is now promised.

The trend of business failures is another index. Measured by liabilities, the high point of the year was August, September showing a slight decrease and October a large further decrease, to the lowest level since May, October being 14 per cent. under the average of the nine months preceding. The October assets were 21 per cent. under the corresponding average. While the financial situation has been regarded as very unsatisfactory, the October failures were apparently due less to tight money, and more to the operations of the concerns involved being commercially unprofitable, than is usually the case. In October the proportion of assets to liabilities was 53 per cent., while the proportion in the preceding nine months was 57 per cent. In October, 1907, when failures occurred chiefly by reason of tight money, the proportion of assets to liabilities rose to 85 per cent.

The trend in bank clearings became favorable in October. The weekly average in August was 24 per cent. less than that of July, while September showed a decrease of 8 per cent. from August. October has now shown an increase of 7 per cent. over September.

Corporate financing is naturally showing a favorable trend, and that is all that can be expected, seeing that in August scarcely anything was done. In the first seven months of the year corporate financing averaged \$156,000,000 a month. The record since then has been: August, \$12,000,000; September, \$14,500,000; October, \$69,500,000. While the trend itself is favorable, the condition is still extremely bad. In the first seven months of the year 64 per cent. of the financing was new and 36 per cent. refunding; in the past three months 10 per cent. was new and 90 per cent. refunding.

These citations of important statistics indicate that in finance and commerce as a whole substantial progress toward recovery is now being made.

The turning point has been rounded, and there is every prospect that the progress will be continued. It is almost inconceivable that anything could occur that would shock business and finance more than did the inception of this great war. The period of panic, of unreasoning fear, is passing, the real dangers are being faced and the problems are being solved. Complete confidence cannot be restored, and business cannot reach a stage of full normal activity in a period of weeks, or even of a few months, but the trends are now in the right direction. Having passed to a stage of greater inaction than current business and financial conditions required, the steel market is in line for a slight recovery, to put it in step with general business.

Some Comfort for Industrial Railroads

Having declared illegal, by its decision of January 20, 1914, all allowances by the line carriers to all industrial railroads, the Interstate Commerce Commission by its announcement of last Friday has opened the way for the industrial railroad to restore such of its former arrangements as it can induce the commission to approve.

This yielding on the part of the commission is more or less grudging, since it falls back upon something not referred to at all in its original decision—the commodities clause in the general law. What has occurred in substance is that instead of the commission disallowing one practice or another in the case of individual industrial railroads, everything has been ruled out, with permission to the industrial roads to seek a restoration of some of the former practices. Apparently the commission would not have taken even this ground had it not been for the recent tap-line decision of the Supreme Court. Commissioner Harlan, by the way, who wrote the decision of last January, dissents from the ruling of last week, holding that the tap-line decision does not apply to these industrial railroads.

On the surface it would appear that the industrial railroads have gained something like a victory, but the extreme slowness with which the commission moved in the recent 5 per cent. rate case, and in the reopened case now in progress, suggests very strongly that such roads have a long and hard road to travel in securing a restoration of even a moiety of the allowances they formerly received from the line carriers. To the lay mind there seems to be a great element of injustice in the character of these proceedings; for whatever may eventually be allowed the industrial railroads will be an admitted right, and to deny such rights sweepingly, and then put the industrial railroads to the great trouble and expense involved in re-establishing them, seems decidedly harsh.

In the original decision the commission properly observed that the case of industrial railroads had reached "the parting of the ways"—though really the point must have been reached years ago, if at all—and that if these allowances were specifically permitted, many other industrial railroads would immediately apply for similar privileges; but what, according to the commission, was an attempt to protect the public has resulted in the doing of a great injustice to such of the industrial railroads as may be found at some future time, perhaps far distant,

to be entitled to certain allowances. It is not sufficient to urge that the present order results merely from the tap-line decision of the Supreme Court, for the commission had it in its power to interpret the law and permit the allowances without recourse to a court decision. When the commission came to the "parting of the ways" it should have pointed out the way, instead of erecting a stone wall through which the innocent traveler would be obliged to force a way. The whole case was before the commission, which indeed went to the trouble to place the industrial railroads in two classes, one of which it put out of the running by one sweep, while the other, the six important lines of steel interests, it decapitated individually. In this detailed analysis there was room for the allowance of certain things and the disallowance of others, in plain and businesslike manner.

What jarred upon the commission, apparently, was the fact that the industrial railroads, or "plant facilities," were making money. But why were they ever built if they could not make money for somebody? At times it seems as if that were an unpardonable offense and that the Commerce Commission has set for itself the task of seeing that its occurrence is not too frequent.

A meeting on steam boilers is to be held at the La Salle Hotel, Chicago, November 20, by Chicago members of the American Society of Mechanical Engineers. A paper on a new high-pressure steam safety boiler is to be presented by W. H. Winslow, president Winslow Safety High Pressure Boiler Company; one on boiler furnace efficiency, by Joseph W. Hays, combustion engineer; one on boiler efficiency meters and European boiler practice, by W. A. Blonck, consulting engineer, and one on mechanical filters, by Walter H. Green, chief engineer International Filter Company.

CORRESPONDENCE

Makers of Special Plates Wanted

To the Editor: A number of inquiries have been sent us from foreign customers requesting us to supply hydraulic presses with a large number of steam-heated plates in them—20 in each press and more if possible. These plates, we have been informed, are made from solid steel and bored (?) for steam heating inside and their thickness is 1¼ in. finished, i. e., planed on both sides. They have to stand an outside pressure in the press of 400 lb. per sq. in. and a steam pressure of 100 lb. inside.

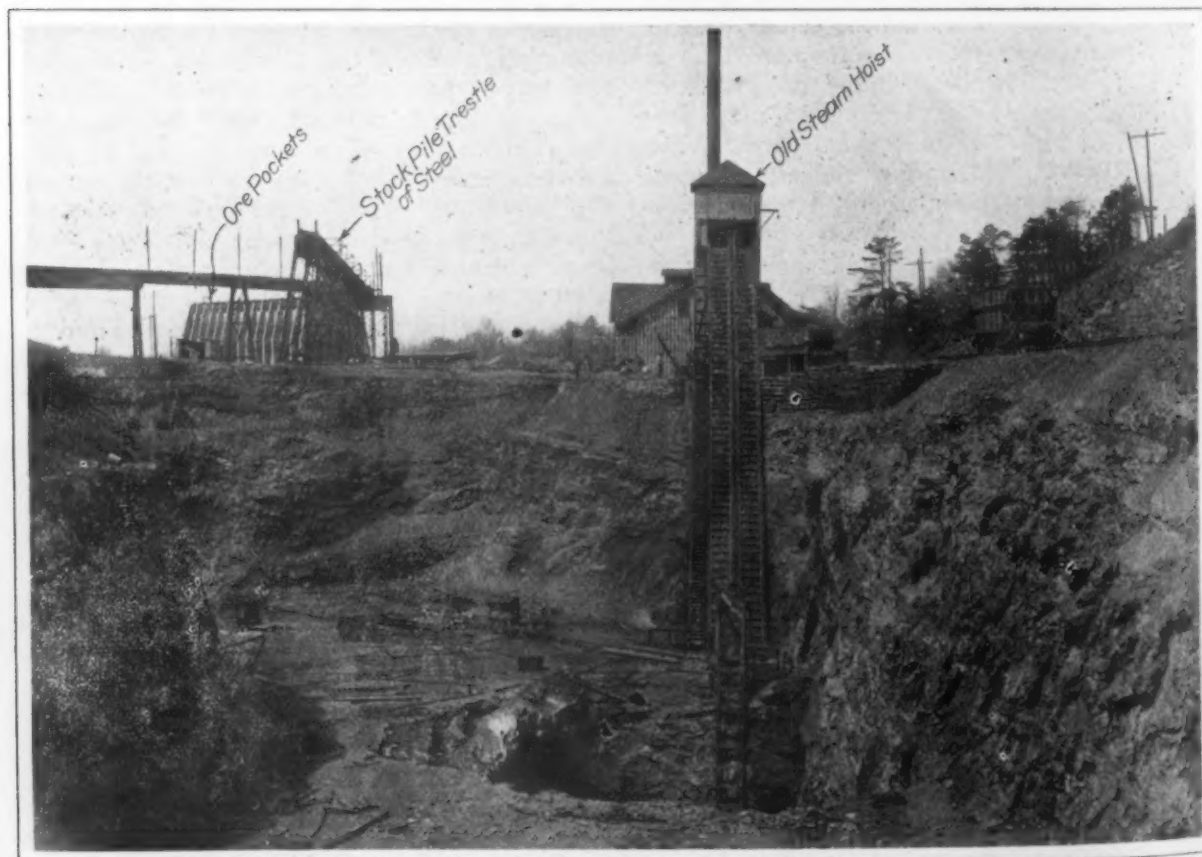
Can any of the readers of *The Iron Age* tell us where we could secure plates of this kind? We have an idea that they perhaps could be cored—graphite—or perhaps that a coil of some kind of pipe could be cast right into the steel, the sole object being of heating the plate over the entire surface. There is a great demand for such a plate and we wish to impress upon likely makers that we would be able to place large orders if we can secure the right kind of a plate.

Application can be made to *The Iron Age* for our address. EXPORTERS.

First Steel Ore Stocking Trestle

To the Editor: I note in your issue of October 22 an article entitled "Steel Ore Stocking Trestle" which you reproduce from a paper read by S. R. Elliott at the meeting of the Lake Superior Mining Institute. You give a photograph of the steel ore stocking trestle recently completed at the Negaunee Mine. It is stated in the article that this trestle is thought to be the first and only steel stocking trestle erected for that purpose.

I beg leave to call your attention to the fact that the Cornwall Ore Bank Company has a stock pile trestle of steel as part of its improved mining equipment, which plant includes electric operation of hoist, ore crushing, transfer cars and steel ore stock pile so that the honor of having the first permanent stock pile



View Taken March 28, 1910, of the Steam Hoist, Stock Pile Trestle and Ore Pockets of the Cornwall Ore Bank Company. Electric Hoist Not in Field of Picture. The steel trestle is of 40 ft. high bents spaced on 40-ft. centers.

restle apparently rests with this company. I am inclosing herewith a photograph showing this part of our plant.

HARRISON SOUDER,

General Superintendent, Cornwall Ore Bank Company.
Cornwall, Pa., October 26, 1914.

New Members Iron and Steel Institute

Recent elections have added the following to the list of members of the American Iron and Steel Institute:

Frank E. Bachman, MacIntyre Iron Company, Port Henry, N. Y.
Frank G. Cutler, chief steam engineer Tennessee Coal, Iron & Railroad Company, Ensley, Ala.
M. M. Duncan, director Cleveland-Cliffs Iron Company, Lehigh, Mich.
Richard H. Lee, superintendent blast furnaces Pennsylvania Steel Company, Lebanon, Pa.
Malcolm R. Maclean, manager of sales, miscellaneous department, American Steel Foundries, Pittsburgh, Pa.
George W. Vreeland, superintendent blast furnaces Mingo and Bellaire works, Carnegie Steel Company, Mingo Junction, Ohio.
Herbert Wright, contracting manager American Bridge Company, Atlanta, Ga.
John Joseph Eagan, president American Cast Iron Pipe Company, Birmingham, Ala.
Frank L. Estep, chief engineer Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.
David Lloyd Eynon, roll designer, Homestead plant, Carnegie Steel Company, Munhall, Pa.
Charles F. Kaufholz, general manager Perry Iron Company, Erie, Pa.
William Warren Shilling, president Sharon Foundry Company, Sharon, Pa.
J. Warner Shook, consulting engineer, Birmingham, Ala.
James W. Whitley, manager coal and coke sales, Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.
Frederick B. Winslow, auditor Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.

Associate Members

Charles L. Bauer, president Bauer Brothers Company, Springfield, Ohio.
Frank E. Nulsen, president Missouri Malleable Iron Company, East St. Louis, Ill.
Sanford B. Belden, vice-president Jeffrey Mfg. Company, Columbus, Ohio.
Charles M. Blanchard, district manager Jeffrey Mfg. Company, Birmingham, Ala.
Robert H. Jeffrey, vice-president and general manager Jeffrey Mfg. Company, Columbus, Ohio.
Z. B. Leonard, metallurgical engineer Perfection Spring Company, Cleveland, Ohio.
John L. V. Bonney, president Bonney-Floyd Company, Columbus, Ohio.
Archer H. Carpenter, Carpenter & Hillman, Birmingham, Ala.
John E. Kent, general manager American Cast Iron Pipe Company, Birmingham, Ala.
James R. McWane, vice-president American Cast Iron Pipe Company, Birmingham, Ala.
Paschal G. Shook, president Shook & Fletcher Supply Company, Birmingham, Ala.
Hamilton Stewart, secretary Harbison-Walker Refractories Company, Pittsburgh, Pa.
Priestley Toulmin, coal operator, Birmingham, Ala.
Herbert Tutwiler, Southern sales agent Sloss-Sheffield Steel & Iron Company, Birmingham, Ala.

Swedish Iron Trade Two-Thirds Full

Statistics compiled by the Swedish Ironworks Association show as follows the condition of the steel industry there on August 27:

	Blast furnaces	Lancashire hearth	Open- hearth	Bessemer converters
Working on June 30.....	108	199	56	15
Replies received regarding Of the furnaces referred to, there were working on	95	177	52	15
August 27	63	97	38	9
Per cent. of total.....	66.3	54.8	73.1	60.0

Of 29 plants having rolling mills, 7 were running at 100 per cent. of capacity, 7 at 75 per cent., 9 at 50 to 75 per cent., and 2 at less than 50 per cent., with 4 entirely closed down.

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International Engineering Congress

Further particulars have been received of the International Engineering Congress which is to be held under the auspices of five national engineering societies at San Francisco, September 20 to 25, 1915. The meetings will be held in a new auditorium building in the civic center of San Francisco, in which the Panama-Pacific Exposition authorities have reserved for the week of the congress a number of assembly, section and committee rooms. Some 300 papers are expected to be presented in 10 or more sections. It is expected that the transactions of the congress will be published in 10 volumes, 6 x 9 in. in size, and of about 500 pages each. Two of the volumes will cover together mechanical engineering and electrical engineering, 28 topics for the former and 8 for the latter, and mining engineering and metallurgy will be comprised in another volume, with 10 topics on mining engineering and 10 topics on metallurgy.

At the present time papers are expected from 20 countries other than the United States. The general fee for membership in the congress is \$5, which will entitle a member to receive the index volume and any single volume of the transactions he may select, and to participate in the general activities and privileges of the congress. W. F. Durand, professor of mechanical engineering, Leland Stanford Jr. University, is chairman of the congress, and W. A. Cattell, consulting engineer, San Francisco, is secretary and treasurer. The committee has appointed an executive secretary, E. J. DuPuy, who has offices in the Foxcroft Building, San Francisco.

The Iron and Metal Markets

NO INCREASE IN ORDERS

Improvement Is Only in Sentiment

British Exports of Ferromanganese Forbidden—
Tin Plates for 1915.

The better sentiment in the steel trade, which was evident one week ago, is more generally recognized, but it has not yet affected buying. The decline in orders shown by the Steel Corporation's statement as of October 31 has not been checked, but the nearness of 1915 and the small provision made for the needs of manufacturing consumers beyond December bolster hopes of a turn near at hand.

A smaller loss in the Steel Corporation's unfilled orders last month than in September would give more reason for favorable comment had not October operations steadily declined. This week the situation in the Chicago district stands out, with the nearly complete closing down of the Gary works. Other mills there are running single turn and only part time.

Hopeful views are mainly based on easier money, the increasing foreign trade balance, and the belief that railroad buying will soon expand, with an increase in freight rates.

The announcement that Great Britain had forbidden ferromanganese exports to this country comes this week with apparent authority. Last week such action was both affirmed and denied. Our London cable says that concessions may be made if proper guarantees are given against re-exports from the United States. The small re-sales reported here, though to neutral countries, have been made much of in Great Britain, as it was charged some of the metal was going into Germany.

It is one sign of the present low rate of steel production that this action of the British Government has caused no flurry in this market. It is to be considered also that as British makers of ferromanganese work off their low-priced American contracts they will not readily give up the profits to be had under prevailing war prices.

Prices of finished steel products have naturally settled, but until larger business appears the low levels of late 1911 are not to be expected. Plates have sold as low as 1.05c., Pittsburgh, and a delivered price of 1.25c. on plates and shapes at Milwaukee and Chicago has been common. Bars have shown less weakness, but 1.10c., Pittsburgh, has been done on a particularly good order. A round lot of reinforcing bars in Eastern territory has started some cutting.

The Boston Store addition at Chicago, 4000 tons, is the largest structural order. At Cleveland bids were taken on 1000 tons for new coke and ore bins, and various railroad lettings in the East and Central West amount to 2000 tons.

A larger car movement in the West, due to increased grain exports, has revived expectations of car orders, and the necessities of the Harriman and the Rock Island lines are put at a total of 40,000. Chicago reports a 15,000-ton inquiry for tie plates and in spikes and bolts several large lots are to be

bought. Rail output is just now at the lowest rate in years.

Foreign orders for various products for war purposes are smaller, though a good part of France's inquiry for 27,000 tons of steel, much of it bars for shrapnel, is yet to be placed.

The tin plate basis for next year's contracts may soon be fixed by actual transactions. Consumers have talked \$3.25, Pittsburgh. The largest contracts have generally gone at a 5c. to 10c. concession from the usual market price. Domestic mills have taken an order for 35,000 boxes for Japan in competition with Wales.

Pig-iron buying for the first quarter and first half of 1915 has brought out further concessions in some districts, notably Chicago, where \$12.50 at furnace for No. 2 is now reported. Southern iron has sold at \$10 for the entire first half. A British user of hematite iron has offered the equivalent of \$14.60 at seaboard, this side, for 3000 to 4000 tons a month. With a phosphorus limit of 0.05 per cent. the business is far from being attractive.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics

At date, one week, one month, and one year previous.

	Nov. 11, 1914.	Nov. 4, 1914.	Oct. 14, 1914.	Nov. 12, 1913.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia...	\$14.50	\$14.50	\$14.75	\$15.50
No. 2, Valley furnace...	12.75	12.75	13.00	13.50
No. 2 Southern, Cin'ti...	12.90	12.90	12.90	13.75
No. 2, Birmingham, Ala...	10.00	10.00	10.00	10.50
No. 2, furnace, Chicago*	12.50	12.75	13.00	15.00
Basic, del'd, eastern Pa.	14.00	14.00	14.00	15.00
Basic, Valley furnace...	12.50	12.50	13.00	13.25
Bessemer, Pittsburgh...	14.55	14.55	14.90	16.15
Malleable Bess., Ch'go*	13.00	13.00	13.00	15.00
Gray forge, Pittsburgh...	13.40	13.40	13.65	14.25
L. S. charcoal, Chicago...	15.75	15.75	15.75	15.25

Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh...	19.50	19.50	20.00	21.00
O.-h. billets, Pittsburgh...	19.50	19.50	20.00	21.00
O.-h. sheet bars, P'gh...	20.00	20.00	20.50	21.50
Forging billets, base, P'gh...	24.00	25.00	25.00	26.00
O.-h. billets, Phila...	21.40	21.40	22.90	23.90
Wire rods, Pittsburgh...	25.50	25.50	26.00	26.00

Old Material, Per Gross Ton:				
Iron rails, Chicago...	11.00	11.00	11.25	13.50
Iron rails, Philadelphia...	13.00	13.00	14.00	17.50
Carwheels, Chicago...	9.75	10.50	10.75	12.00
Carwheels, Philadelphia...	9.50	9.50	10.50	12.00
Heavy steel scrap, P'gh...	10.00	10.00	11.00	11.50
Heavy steel scrap, Phila...	9.25	9.50	10.00	10.25
Heavy steel scrap, Ch'go...	8.00	8.50	8.50	9.50
No. 1 cast, Pittsburgh...	10.50	10.50	11.50	12.00
No. 1 cast, Philadelphia...	11.00	11.00	11.50	12.50
No. 1 cast, Ch'go (net ton)	8.50	8.75	9.00	10.00

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.12	1.12	1.12	1.30
Iron bars, Pittsburgh...	1.15	1.15	1.15	1.40
Iron bars, Chicago...	0.95	0.97 1/2	1.00	1.15
Steel bars, Pittsburgh...	1.10	1.10	1.15	1.45
Steel bars, New York...	1.31	1.31	1.31	1.25
Tank plates, Pittsburgh...	1.10	1.10	1.15	1.41
Tank plates, New York...	1.26	1.26	1.31	1.30
Beams, etc., Pittsburgh...	1.10	1.10	1.15	1.46
Beams, etc., New York...	1.26	1.26	1.31	1.25
Skelp, grooved steel, P'gh	1.10	1.10	1.15	1.25
Skelp, sheared steel, P'gh	1.15	1.15	1.20	1.25
Steel hoops, Pittsburgh...	1.25	1.25	1.25	1.50

Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh...	1.90	1.90	1.95	2.00
Galv. sheets, No. 28, P'gh...	2.90	2.90	2.95	3.00
Wire nails, Pittsburgh...	1.60	1.60	1.60	1.60
Cut nails, Pittsburgh...	1.60	1.60	1.60	1.55
Fence wire, base, P'gh...	1.40	1.40	1.40	1.40
Barb wire, galv., P'gh...	2.00	2.00	2.00	2.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,

	Nov. 11, 1914.	Nov. 4, 1914.	Oct. 14, 1914.	Nov. 12, 1913.
Per Net Ton at Oven:				
Furnace coke, prompt....	\$1.50	\$1.60	\$1.60	\$1.85
Furnace coke, future....	1.75	1.75	1.75	2.00
Foundry coke, prompt....	1.90	2.00	2.00	2.65
Foundry coke, future....	2.15	2.15	2.15	2.75

Metals.

	Cents.	Cents.	Cents.	Cents.
Per Lb. to Large Buyers:				
Lake copper, New York.	11.50	11.50	12.00	16.25
Electrolytic copper, N. Y.	11.25	11.25	11.37 1/2	15.50
Spelter, St. Louis.....	4.80	4.90	4.65	5.15
Spelter, New York.....	4.95	5.05	4.80	5.30
Lead, St. Louis.....	3.40	3.37 1/2	3.35	4.20
Lead, New York.....	3.50	3.50	3.50	4.35
Tin, New York.....	34.25	31.80	29.75	39.50
Antimony, Hallett's, N. Y.	15.50	15.00	12.00	7.25
Tin plate, 100-lb. box, P'gh	\$3.15	\$3.15	\$3.25	\$3.40

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32c. (after November 16, 32.9c.); Denver, 68.6c.; New Orleans, 80c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal on plates, shapes, etc., is 46c.

Plates.—Tank plates, 1/4 in. thick, 6 1/4 in. up to 100 in. wide, 1.10c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1905, or equivalent, 1/4 in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft. are considered 1/4 in. plates. Plates over 72 in. wide must be ordered 1/4 in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under 1/4 in. to and including 3-16 in....	.10
Gauges under 3-16 in. to and including No. 8....	.15
Gauges under No. 8 to and including No. 9....	.25
Gauges under No. 9 to and including No. 10....	.30
Gauges under No. 10 to and including No. 12....	.40
Sketches (including straight taper plates), 3 ft. and over.....	.10
Complete circles 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zees, 3 in. and over, 1.10c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.....	.10
H-beams over 18 in.....	.10
Angles over 6 in., on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than 1/4 in. thick, as per steel bar card, Sept. 1, 1909....	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).....	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.....	.20 to .80
Deck beams and bulb angles.....	.30
Hand rail tees.....	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.40; galvanized, \$1.80. Galvanized barb wire and fence staples to jobbers, \$2; painted, \$1.60. Wire nails to jobbers, \$1.60. Woven wire fencing, 73 per cent. off list for carloads; 72 off for 1000-rod lots; 71 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.									
Nos.	0 to 9	10	11	12	12½	13	14	15	16
Annealed	....\$1.55	\$1.60	\$1.65	\$1.70	\$1.80	\$1.90	\$2.00	\$2.10	\$2.20
Galvanized	....2.00	2.00	2.05	2.10	2.20	2.30	2.70	2.80	

Wire Rods.—Bessemer, open-hearth and chain rods, \$25.50.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from November 2, 1914, and iron pipe from June 2, 1913, all full weight:

Steel			Butt Weld			Iron		
Inches	Black	Galv.	Inches	Black	Galv.	Inches	Black	Galv.
1/4, 1/2 and 3/4	74	53 1/2	1 1/4	66	47	1 1/4	66	47
1/2	78	67 1/2	1 1/2	65	46	1 1/2	65	46
3/4 to 3	81	72 1/2	1 3/4	69	56	1 3/4	69	56
			2	72	61	2	72	61
2	78	69 1/2	1 1/4	56	45	1 1/4	56	45
2 1/2 to 6	80	71 1/2	1 1/2	67	56	1 1/2	67	56
7 to 12	77	66 1/2	2	68	58	2	68	58
13 and 14	63 1/2		2 1/2 to 4	70	61	2 1/2 to 4	70	61
15	61		4 1/2 to 6	70	61	4 1/2 to 6	70	61
			7 to 12	68	55	7 to 12	68	55

Reamed and Drifted			Lap Weld		
Inches	Black	Galv.	Inches	Black	Galv.
1 to 3, butt.....	79	70 1/2	1 to 1 1/2, butt...	70	59
2, lap.....	76	67 1/2	2, butt.....	70	59
2 1/2 to 6, lap....	78	69 1/2	1 1/4, lap.....	54	43
			1 1/2, lap.....	65	54
			2, lap.....	66	56
			2 1/2 to 4, lap....	68	59

Butt Weld, extra strong, plain ends			Lap Weld, extra strong, plain ends		
Inches	Black	Galv.	Inches	Black	Galv.
1/4, 1/2 and 3/4	69	58 1/2	1 1/4	63	52
1/2	74	67 1/2	1 1/2	67	60
3/4 to 1 1/2	78	71 1/2	2	71	62
2 to 3	79	72 1/2	2 1/2 to 4	72	63

Butt Weld, double extra strong, plain ends			Lap Weld, double extra strong, plain ends		
Inches	Black	Galv.	Inches	Black	Galv.
1/4	64	57 1/2	1 1/4	57	49
1/2 to 1 1/2	67	60 1/2	1 1/2	60	52
2 to 2 1/2	69	62 1/2	2 and 2 1/2	62	54

Butt Weld, double extra strong, plain ends			Lap Weld, double extra strong, plain ends		
Inches	Black	Galv.	Inches	Black	Galv.
2	65	58 1/2	2	55	49
2 1/2 to 4	67	60 1/2	2 1/2 to 4	60	54
4 1/2 to 6	66	59 1/2	4 1/2 to 6	59	53
7 to 8	59	48 1/2	7 to 8	52	42

To the large jobbing trade an additional 5 and 2 1/2 per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		Standard Charcoal Iron	
1 1/4 and 2 in.....	62	1 1/4 in.....	45
2 1/4 in.....	59	1 1/2 and 2 in.....	49
2 1/2 and 2 3/4 in.....	65	2 1/4 in.....	45
3 and 3 1/4 in.....	70	2 1/2 to 2 3/4 in.....	54
3 1/2 and 4 1/2 in.....	72	3 and 3 1/4 in.....	57
5 and 6 in.....	65	3 1/2 and 4 1/2 in.....	60
7 to 13 in.....	62	5 and 6 in.....	49

Locomotive and steamship special charcoal grades bring higher prices.

2 1/2 in. and smaller, over 18 ft., 10 per cent. net extra.
2 3/4 in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice:

	Cents per lb.
Blue Annealed Sheets	
Nos. 3 to 8.....	1.35 to 1.40
Nos. 9 to 10.....	1.40 to 1.45
Nos. 11 and 12.....	1.45 to 1.50
Nos. 13 and 14.....	1.55 to 1.60
Nos. 15 and 16.....	1.65 to 1.70

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11.....	1.55
No. 12.....	1.55
Nos. 13 and 14.....	1.60
Nos. 15 and 16.....	1.65
Nos. 17 to 21.....	1.70
Nos. 22 and 24.....	1.75
Nos. 25 and 26.....	1.80
No. 27.....	1.85
No. 28.....	1.90
No. 29.....	1.95
No. 30.....	2.05

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11.....	1.90
No. 12.....	2.00
Nos. 13 and 14.....	2.00
Nos. 15 and 16.....	2.15
Nos. 17 to 21.....	2.30
Nos. 22 and 24.....	2.45
Nos. 25 and 26.....	2.60
No. 27.....	2.75
No. 28.....	2.90
No. 29.....	3.05
No. 30.....	3.20

Pittsburgh

PITTSBURGH, PA., November 10, 1914.

Probably as a result of the elections, sentiment in the steel trade is better, and this is expected later to develop into more orders. The inquiry for pig iron is greater than for some time. Some betterment is noted in the demand for sheets, and inquiries are out for furnace coke for first half. The opinion is strong that low tide in the steel trade has been reached, and that conditions in the near future are almost certain to show improvement. It is not believed there can be any advance in prices until there are more orders on mill books, which have not been so lean in a good many years. There have been no profits, but heavy losses, in the steel business this year, and for this reason the mills are likely to be conservative in selling material at present prices for forward delivery. Consumers are watching the situation closely and are now taking more interest in the market than for many months. Stocks are very low and it will take some time to put them in normal condition again.

Pig Iron.—The inquiry for pig iron in this market is larger than for some months. Consumers evidently believe that prices have about reached bottom. It is stated that several small lots of Bessemer iron have sold as high as \$13.75, Valley furnace, but it can be bought at a slightly lower price from other sources. The Wheeling Mold & Foundry Company has covered with a local interest for a part of about 20,000 tons of pig iron it will need to fill its contracts recently taken for about 22,000 tons of segments for New York City river tunnels and will likely close for the remainder this week. We quote Bessemer at \$13.60 to \$13.75; basic, \$12.50; No. 2 foundry, \$12.75 to \$13; malleable Bessemer, \$12.75, and gray forge, \$12.50, all at Valley furnace, with a freight rate of 95c. a ton for delivery in the Pittsburgh district.

Billets and Sheet Bars.—Mills report no new buying of either billets or sheet bars. If an inquiry came out for 3000 to 5000 tons it is hard to tell what price would be named. Specifications from the sheet and tin-plate mills are not so large as last week. Prices on forging and axle billets are slightly lower. We quote Bessemer and open-hearth billets at \$19 to \$19.50, and Bessemer and open-hearth sheet bars, \$19.50 to \$20, f.o.b. maker's mill, Youngstown; Bessemer and open-hearth billets, \$19.50 to \$20, and Bessemer and open-hearth sheet bars \$20 to \$20.50, f.o.b. maker's mill, Pittsburgh. Forging billets are quoted at \$24 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take \$1 per ton extra. Axle billets are quoted at \$21 to \$22, f.o.b. Pittsburgh.

Ferroalloys.—Consumers are well covered for some time, and the price of \$68, seaboard, held by importers for 80 per cent. English ferromanganese, is purely nominal. Several local brokers are offering 80 per cent. for quick shipment from stock at about \$60 per ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; over 600 tons, \$71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is \$19; 11 per

cent., \$20, and 12 per cent., \$21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Steel Rails.—Nothing is known here of the reported inquiry from Russia for 20,000 tons of light rails. There is practically no domestic demand for standard sections. The Edgar Thomson mills of the Carnegie Steel Company are running on billets and sheet bars, having no orders for rails. New business in light rails is quiet, especially from the coal-mining companies, as the coal business is in bad condition. The Carnegie Steel Company is receiving 1200 to 1500 tons of light rails each week in new orders and specifications. We quote standard section rails, made of Bessemer stock, at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots; 8 and 10 lb. sections, 1.275c.; 12 and 14 lb., 1.225c.; 16 and 20 lb., 1.175c.; 25, 30, 35, 40 and 45 lb. sections, 1.125c. Extras over the above prices are as follows:

Bond drilling, one hole.....	\$0.045 per 100 lb.
Bond drilling, two holes.....	0.090 per 100 lb.
Bond drilling, one hole in flange....	0.090 per 100 lb.
Bond drilling, two holes in flange....	0.180 per 100 lb.
All 30 ft. and special lengths, down to but not including 12 ft.....	0.045 per 100 lb.
Special lengths, 12 ft. and under....	0.090 per 100 lb.
Notching.....	0.025 per 100 lb.

The above prices are for carload lots, the usual differentials being allowed for large lots.

Structural Material.—A fair amount of new work has been placed, but inquiry is light. The American Bridge Company has taken 800 tons for six steel barges, which it will build at its Ambridge, Pa., plant for the Rodgers Sand Company. The McClintic-Marshall Company will build an addition to the sheet mills of the Newport Rolling Mill Company, Newport, Ky., requiring about 500 tons, and has also taken 300 tons of grade crossing work for the Pennsylvania Railroad at Wilkinsburg, Pa., the Cambria Steel Company having secured about 400 tons for the same job. Bids have gone in on about 500 tons for a high school at Washington, D. C., and also for ore and coke bins for Corrigan, McKinney & Co., Cleveland, Ohio, about 1000 tons. The James Stuart Company, Pittsburgh, has taken the general contract for the erection of the Schenley high school in this city, and the material, about 1200 tons, will be placed in a short time. We quote beams and channels up to 15-in. at 1.10c. to 1.15c. f.o.b. Pittsburgh, depending on the order.

Plates.—No new inquiries for steel cars have come out and conditions among the carbuilders are worse than for some years. The general demand for plates is dull, none of the mills being able to run to more than 35 to 40 per cent. The situation in plates, as regards business on the books of the mills, is probably worse than in any other line of finished material. We continue to quote ¼-in. and heavier plates at 1.10c., f.o.b. Pittsburgh, but on a very desirable order for prompt shipment this price might be shaded about \$1 per ton.

Wire Rods.—There is still some foreign inquiry, but no large lots of rods for export have been closed for some time. The domestic demand is dull; in fact, there has not been a large inquiry for rods in the local market for some time. We quote Bessemer, open-hearth and chain rods at \$25.50 to \$26, Pittsburgh.

Skelp.—The local trade in skelp is stagnant, as pipe mills are running to only 35 to 40 per cent. and are not buying. Several fair-sized inquiries for skelp for shipment to England are reported in the market. We quote: Grooved steel skelp, 1.10c. to 1.15c.; sheared steel skelp, 1.15c. to 1.20c.; grooved iron skelp 1.45c. to 1.50c.; sheared iron skelp, 1.50c. to 1.60c., delivered to consumers' mills in the Pittsburgh district.

Tin Plate.—Some small demand for tin plate for prompt shipment from stock is noted. Contracts for this year's delivery have been pretty well filled. As yet, none of the mills has announced prices on contracts for 1915 delivery, but some fair-sized lot have been sold for the first two or three months. We quote for prompt delivery from stock 100-lb. 14 x 20 coke plates at \$3.15 to \$3.25 per box, and 100-lb. 14 x 20terne plates at \$3.10 to \$3.20 per box, f.o.b. Pittsburgh.

Wire Products.—Barb wire, fence wire and wire nails are in continued active demand from England, Russia, South America and other foreign markets. Orders from such sources aggregate a considerable part of the new business being placed. The domestic demand for fence and barb wire is fairly heavy, and shipments by the mills to the home consuming trade are heavier than for some time. Very few wire nails have been sold at the \$1.60 price, and desirable new orders would be taken at \$1.55. We quote wire nails at \$1.60; plain annealed wire, \$1.40; galvanized barb wire and fence staples, \$2; painted barb wire, \$1.60, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at \$1.60 to \$1.65, f.o.b. Pittsburgh, in carload lots. We quote woven wire fencing at 73 per cent. off in carload lots, 72 on 1000-rod lots and 71 on smaller lots, all f.o.b. Pittsburgh.

Shafting.—The new demand is quiet. Makers report that specifications against contracts from automobile builders are still coming in quite freely but from the implement trade are disappointing. The new demand does not represent more than 25 per cent. of capacity, and is only for small lots for prompt shipment. We quote cold-rolled shafting at 66 to 67 per cent. off, depending on the order, delivered in base territory.

Iron and Steel Bars.—The specifications received by the mills for steel bars from the agricultural implement makers so far this season are disappointing. Usually at this time the implement trade is active and its requirements of steel bars are heavy, but this year is an exception. The general demand for both iron and steel bars is dull and shipments by the mills on contracts are light. There is some inquiry for first quarter and first half, but the mills are not disposed to take business so far ahead at present prices. We quote steel bars at 1.10c. to 1.15c. for delivery this month and in December, while for first quarter 1.15c. is being named, and in a few cases 1.20c. to 1.25c. for first half. We quote common iron bars, 1.15c. to 1.20c., f.o.b. Pittsburgh.

Sheets.—In the last three or four days both the new demand and specifications for sheets have been better. Some large consumers that two weeks ago were not interested in the market, even at the low prices ruling, have since come in and bought, and it is believed low ebb has been reached in demand, which is expected to improve materially in the near future. As yet, there is no betterment in prices, but it is believed bottom has about been reached. Efforts to maintain the market on No. 28 Bessemer black sheets at 2c. have been abandoned and nearly all the mills are now quoting 1.90c. We quote No. 28 Bessemer black sheets at 1.90c.; No. 28 galvanized, 2.90c.; Nos. 9 and 10 blue annealed, 1.40c.; No. 28 black plate, tin mill sizes, H. R. & A., 1.90c. A few mills are naming 2.85c. for No. 28 galvanized. These prices are for carload and larger lots, jobbers charging the usual advances for small lots from store. Operations among the sheet mills are from 40 to 50 per cent. of capacity, the lower figure probably representing the average.

Hoops and Bands.—The new demand is only for small lots and specifications against contracts for both hoops and bands are dull, except for hoops for the Pacific coast, where there is a fair amount of activity. We quote steel bands at 1.10c. to 1.15c., with extras as per the steel-bar card, and steel hoops at 1.25c., f.o.b. Pittsburgh. On a desirable order for the latter this price would be shaded.

Railroad Spikes.—There is no betterment in the demand. None of the spike makers is operating to more than 35 to 40 per cent. of capacity. Railroads have a considerable tonnage in spikes due on contracts placed early in the year, but are not specifying. We quote standard sizes of railroad and boat spikes at \$1.40 and small railroad and boat spikes at \$1.50 per 100 lb. in carload lots, f.o.b. Pittsburgh.

Nuts, Bolts and Rivets.—The new demand is only for small lots for prompt shipment, and specifications are dull. Heavy stocks of nuts and bolts are carried

by some makers who are naming low prices to move them. The demand for rivets is dull. We quote structural rivets at 1.45c. and boiler rivets at 1.55c. in carload lots, small lots taking an advance of about 10c. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 5% off
Small carriage bolts, cut threads	80% off
Small carriage bolts, rolled threads	80 and 5% off
Large carriage bolts	75 and 5% off
Small machine bolts, cut threads	80 and 5% off
Small machine bolts, rolled threads	80 and 10% off
Large machine bolts	75 and 10% off
Machine bolts, c.p.c. & t nuts, small	80% off
Machine bolts, c.p.c. & t nuts, large	75 and 5% off
Square h.p. nuts, blank and tapped	\$6.30 off list
Hexagon nuts	\$7.20 off list
C.P.C. and r sq. nuts, blank and tapped	\$6.00 off list
Hexagon nuts, 1/4 in. and larger	\$7.20 off list
Hexagon nuts, smaller than 1/2 in.	\$7.80 off list
C.P. plain square nuts	\$5.50 off list
C.P. plain hexagon nuts	\$5.90 off list
Semi-fin. hex. nuts, 1/2 in. or under	85, 10 & 10% off
Semi-fin. hex. nuts, 3/4 in. and larger	85 & 5% off
Rivets, 7/16 x 6 1/2, smaller & shorter	80, 10 & 5% off
Rivets, tin plated, packages	80, 10 and 5% off
Rivets, metallic tinned, packages	80, 10 and 5% off
Standard cap screws	70, 10 and 10% off
Standard set-screws	75, 10 and 10% off

Merchant Steel.—Several mills report that specifications against contracts for steel used by the implement makers are showing a little betterment, but general trade is very dull. Prices depend entirely on the size of the order and deliveries wanted by the customer. Quotations on small lots for prompt shipment are about as follows: Iron finished tire, 1/2 x 1 1/2 in. and larger, 1.30c., base; under 1/2 x 1 1/2 in., 1.45c.; planished tire, 1.50c.; channel tire, 3/4 to 1 in., 1.80c. to 1.90c.; 1 1/2 in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1 1/2 in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Standard Pipe.—It develops that the order placed recently by a gas interest with the National Tube Company was for 85 miles of 6, 8, 10 and 12-in. pipe, instead of 60 miles, as reported. The Barnsdall interests of this city have placed 30 to 32 miles of 10-in. line pipe with a local mill for prompt shipment for a gas line for delivery at Waco, Texas. The National Gas Company, Hamilton, Ont., has an inquiry out for 25 miles of 6 to 12 in. line pipe. While the feeling in the pipe trade is better, actual orders being placed are not as yet any heavier. The new discounts on steel pipe are being well maintained. Operations among the pipe mills are not more than about 35 per cent. of capacity.

Boiler Tubes.—New demand for locomotive and merchant tubes is very dull and low prices are being made on the small amount of new business being placed. Regular discounts have not cut any figure in actual selling prices for some time.

Coke.—Three or four fair-sized inquiries for furnace coke for delivery in first half are in the market. Coke makers do not care to name a price for delivery so far ahead under present conditions, and blast-furnace interests will not contract except at very favorable prices. Low prices are being made on standard blast-furnace coke for prompt shipment; for delivery in the East it has sold as low as \$1.45 to \$1.50 per net ton at oven. We quote standard makes of blast-furnace coke for prompt shipment at \$1.50 to \$1.60 per net ton at oven. We quote standard makes of 72-hr. foundry coke at \$1.90 to \$2 per net ton at oven for prompt delivery. The output of coke in the upper and lower Connellsville regions for the week ended October 31 was 205,964 tons, according to the Connellsville Courier, a reduction of 23,555 tons over the previous week. This is the lowest output of coke in one week in the two Connellsville regions for some months.

Old Material.—There is no inquiry for scrap from consumers and the only trading is between dealers. Operations among open-hearth steel plants have been on so low a basis for some months that the consump-

tion of scrap has been more than cut in half. Prices on borings, turnings and old carwheels are slightly lower. For delivery to consumers' mills in the Pittsburgh and other consuming districts that take Pittsburgh freights, dealers quote about as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	\$10.00 to \$10.25
Compressed side and end sheet scrap	9.00 to 9.25
No. 1 foundry cast	10.50 to 10.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.00 to 8.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	11.75 to 12.00
No. 1 railroad malleable stock	10.00 to 10.25
Railroad grate bars	9.00 to 9.25
Low phosphorus melting stock	13.00 to 13.25
Iron car axles	18.75 to 19.25
Steel car axles	13.25 to 13.75
Locomotive axles, steel	19.75 to 20.25
No. 1 busheling scrap	9.00 to 9.25
No. 2 busheling scrap	6.00 to 6.25
Machine shop turnings	7.25 to 7.50
Old carwheels	10.75 to 11.00
Cast-iron borings	7.75 to 8.00
*Sheet bar crop ends	10.50 to 10.75
Old iron rails	12.75 to 13.00
No. 1 railroad wrought scrap	10.75 to 11.00
Heavy steel axle turnings	8.25 to 8.50
Heavy breakable cast scrap	10.25 to 10.50

*Shipping point.

This week the Carnegie Steel Company is blowing out Carrie No. 2 furnace at Rankin, Pa., and Duquesne No. 2 at Duquesne, Pa. This will leave 24 stacks in blast, the lowest number operated by the company in some years, and it will have 34 stacks out of blast.

H. S. Lewis, who recently resigned as manager of the Pittsburgh office of the National Fuel Company, Uniontown, Pa., has opened an office in the Oliver Building, Pittsburgh and will handle coal and coke.

Chicago

CHICAGO, ILL., November 10, 1914.

The progress toward the restoration of conditions more favorable to business expansion is now more easily discerned. Large loans have been made here in the past few days at interest rates as low as 5 per cent. The tremendous demand for grain for export is affecting the inland movement and Western railroads are beginning to find themselves taxed to handle traffic. Some relief for the cotton situation seems well nigh assured, and what is perhaps most significant, the market sentiment which attends a rising current of affairs is making itself felt more clearly. The immediate facts are less pleasant to contemplate. Aside from a slightly heavier sprinkling of small orders for immediate shipment, the business of the past week in iron and steel was of little consequence. Curtailment of mill operations in this district includes the shutting down of the entire Gary works with the exception of two or three blast furnaces. Other mills are running on single turn and part time. Prices have been carried down to the point of demoralization and 1.25c. has been done at both Milwaukee and Chicago for plates and shapes. Railroad inquiry for track fastenings for 1915 includes approximately 15,000 tons of tie plates and various lots of spikes and bolts, of which 20,000 kegs of spikes and 10,000 kegs of bolts are illustrative. In fabricated steel the contract for the Boston Store addition, calling for close to 4000 tons and awarded to the American Bridge Company, stands out in solitary magnificence. In other respects the improvement in actual business waits for further encouragement.

Pig Iron.—Comment regarding pig iron can be little else than repetition. The one large inquiry for malleable iron mentioned a week ago is still seeking a price. Other business has little importance. There are many reports of quotations as low as \$12.50, f.o.b. furnace, for Northern No. 2. Conditions continue very unfavorable to Southern iron, although there is some interest in the plans for blowing out a number of furnaces in that section. So far as there is a price, \$10 at Birmingham seems to prevail. The following quotations are for iron delivered at consumers' yards, except those

for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	\$15.75 to \$16.75
Northern coke foundry, No. 1	13.25 to 13.75
Northern coke foundry, No. 2	12.50 to 13.00
Northern coke foundry, No. 3	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft	14.50 to 14.75
Southern coke, No. 2 f'dry and 2 soft	14.00 to 14.25
Malleable Bessemer	13.00 to 13.50
Standard Bessemer	15.50
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. sil'vy, 10 per cent.	18.90 to 19.40

Rails and Track Supplies.—While the railroads have as yet taken on practically nothing for next year, they are procuring quotations for tie-plates, angle bars, spikes and bolts. About 15,000 tons of tie-plates are under consideration, and yearly contracts for spikes and bolts covering quantities running up to 20,000 kegs are up for prices. For contracts, 1.50c. is being quoted for spikes and 1.90c. for bolts. For immediate shipment in small lots quotations are \$1 a ton lower. We quote standard railroad spikes at 1.45c. to 1.50c., base; track bolts with square nuts, 1.85c. to 1.90c., base, all in car-load lots, Chicago; tie-plates, \$25 to \$27, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Car builders are forced to find satisfaction in the reports of accumulated needs among the railroads, and it is authoritatively stated that the Harriman lines must purchase over 30,000 cars and the Rock Island System fully 10,000, while the roads of the Northwest are only now beginning to realize the real extent to which they are crippled. The inquiries for passenger equipment for the Northern Pacific and Great Northern constitute the only live business at present. Steel for building work is almost wholly lacking, with the exception of 4000 tons for an addition to the Boston Store at Chicago, taken by the American Bridge Company. Other contracts noted include none over 300 tons. For plain material 1.28c., Chicago, is still being obtained, but quotations of 1.25c. are noted. We quote for Chicago delivery of plain shapes from mill 1.25c. to 1.33c., Chicago.

The limitation of practically all current business for immediate requirements is supporting a fair demand for steel out of stock. We quote for Chicago delivery of structural shapes from store 1.75c.

Plates.—Orders for the past week have included at least two lots of about 300 tons, and these, with such smaller orders as have been received, totaled a slightly improved aggregate as compared with the past few weeks. The market shows decided weakness as to price and quotations from Ohio mills on business at Chicago and Milwaukee figure back to a 1.05c., Pittsburgh, basis. We quote for Chicago delivery of plates from mill 1.25c. to 1.33c.

We quote for Chicago delivery of plates from store 1.75c.

Sheets.—New business in sheets while somewhat more plentiful than is true of the heavier products is none the less very scattering. Prices for galvanized sheets have followed the slump in spelter and quotations as low as 2.85c., Pittsburgh, have been made. Local sheet mills are running on approximately 50 per cent. basis. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.53c.; No. 28 black, 2.03c. to 2.08c.; No. 28 galvanized, 3.03c. to 3.08c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.55c.

Bars.—The demand for bars has fallen off to a minimum. Mills rolling bar iron and hard steel are operating on intermittent schedules, periods of idleness being followed by a few days of running in which accumulated orders are filled. Bar-iron prices have touched 0.95c. and extras have been but poorly maintained. We quote for mill shipments as follows: Bar iron, 0.95c. to 1.05c.; soft steel bars, 1.25c.; hard steel

bars, 1.25c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—Quotations continue nominally as follows: Carriage bolts up to $\frac{3}{4}$ x 6 in., rolled thread, 85; cut thread, 80-5; larger sizes, 80; machine bolts up to $\frac{3}{4}$ x 4 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; coach screws, 85-10; hot pressed nuts, square head, \$6.60 off per cwt.; hexagon, \$7.60 off per cwt. Structural rivets, $\frac{3}{4}$ to $1\frac{1}{4}$ in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to $\frac{3}{4}$ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to $\frac{3}{4}$ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, \$6, and hexagon, \$6.70 off per cwt.

Wire Products.—While wire mills in the East are finding themselves rushed to meet demands from abroad, reductions of sales forces in the West are the order of the day. New tonnage in wire in this market is scarce. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78; galvanized, \$2.18; polished staples, \$1.78; galvanized, \$2.18, all Chicago.

Cast Iron Pipe.—The award of 300 tons of pipe at Duluth, Minn., went to the National Cast Iron Pipe Company of Alabama, and the small lot of pipe at Hammond, Ind., was taken by the Glamorgan Pipe & Foundry Company. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$26; 6 to 12 in., \$24; 16 in. and up, \$23.50, with \$1 extra for gas pipe.

Old Materials.—The disposal of the heavy lists of scrap by the railroads last week established new low levels in price and our quotations are again reduced. Buying by consumers continues insignificant. Additional railroad offerings, which are small, include 1200 tons offered by the Omaha and a short list by the Wabash. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$11.00 to \$11.25
Old steel rails, rerolling	9.50 to 10.00
Old steel rails, less than 3 ft.	9.25 to 9.50
Old carwheels	9.75 to 10.00
Heavy melting steel scrap	8.00 to 8.50
Frogs, switches and guards, cut apart	8.25 to 8.75
Shoveling steel	7.75 to 8.00
Steel axle turnings	6.50 to 7.00

Per Net Ton	
Iron angles and splice bars	\$10.50 to \$11.00
Iron arch bars and transoms	10.25 to 10.75
Steel angle bars	7.25 to 7.75
Iron car axles	13.75 to 14.00
Steel car axles	10.25 to 10.75
No. 1 railroad wrought	7.50 to 7.75
No. 2 railroad wrought	7.00 to 7.25
Cut forge	7.00 to 7.25
Steel knuckles and couplers	8.00 to 8.50
Steel springs	9.00 to 9.50
Locomotive tires, smooth	8.75 to 9.25
Machine shop turnings	4.50 to 4.75
Cast borings	4.50 to 4.75
No. 1 busheling	6.50 to 6.75
No. 2 busheling	5.50 to 5.75
No. 1 boilers, cut to sheets and rings	5.00 to 5.50
Boiler punchings	8.75 to 9.25
No. 1 cast scrap	8.50 to 8.75
Store plate and light cast scrap	7.75 to 8.25
Grate bars	7.25 to 7.75
Railroad malleable	7.75 to 8.00
Agricultural malleable	7.25 to 7.50
Pipes and flues	5.50 to 5.75

Philadelphia

PHILADELPHIA, PA., November 10, 1914.

On all sides comment is heard that a better sentiment prevails, but the more cheerful mental attitude is not supported by an increase in the volume of sales or even more numerous inquiries. It is based on more or less extraneous influences. The aggregate sales of pig iron continue at about the same rate as of recent weeks, with a few inquiries coming out for deliveries which will run into next year. A small but steady increase in export business has been noted in some directions, while all that some sellers have had are what they call sample orders. Prices show a continued tendency to soften and at present levels there is no disposition to sell far ahead. Orders have been given for the blowing out of a furnace of the Alan Wood Iron & Steel Company, at Swedeland, Pa. Plates are easy at 1.10c.,

Pittsburgh base, and that quotation is mentioned also for plain shapes where a round lot is concerned. Steel bars are holding up better in regard to price than other products, though the demand is not heavy. Sheet makers are asking 1.55c., Philadelphia, for No. 10 blue annealed, though 1.50c. is accepted elsewhere. Old material continues inactive.

Iron Ore.—Imports of the week ended November 7, at this port, were 6000 tons from Spain, 4750 tons from Cuba and 7100 tons from Chile.

Pig Iron.—Actual sales have not increased in volume to any noteworthy extent though inquiries for deliveries to extend into next year are a little more numerous and a few sales of this kind have been made on the basis of present prices, especially of Virginia iron, with the understanding that deliveries are to begin at once. Inquiries have been received from two or three Virginia pipe foundries that want No. 3 iron in lots of 150 to 400 tons. The better part of the business of the past few days has been in specialties for which uniformly good prices have been obtained. The lowest price mentioned for No. 2 foundry iron is \$14.45, Philadelphia. In the first week of this month a Virginia producer booked orders for 750 tons, while deliveries against old contracts kept up satisfactorily. It appears that the sales made by a new producer of standard low phosphorus were made at the exceptionally low price of \$18.75, delivered to a point which takes a 40c. freight rate, but the long-established makers of this grade of iron do not admit that they have any occasion to meet this price. Foundry owners who do a jobbing business find no change of a cheering character in the demand for castings, but manufacturers who have foundries as adjuncts to their plants are much more hopeful, in some cases because of better demand upon them and in others merely because of a more optimistic feeling. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X foundry	\$14.50 to \$14.75
Eastern Penna. No. 2 plain	14.25 to 14.50
Virginia No. 2 X foundry	15.25
Virginia No. 2 plain	15.00
Gray forge	13.50 to 13.75
Basic	14.00
Standard low phosphorus	20.00 to 21.00

Ferroalloys.—The market is quiet, with dealers adhering to \$68, seaboard. Reports of resale lots continue to be heard, although it is pretty certain that there is not so much of this kind of selling as a couple of weeks ago. It is understood that a carload was delivered for \$67.50, or about \$66, seaboard. An interesting fact is that a week ago an English producer suggested to his representative in this country that requisitions be made as heavy as possible. The quotation for 50 per cent. ferrosilicon is \$71 to \$73, according to quantity. Arrivals of ferromanganese at this port from England last week totaled 263 tons.

Bars.—The demand for steel bars is quiet, but they are, nevertheless, stronger than other steel products. A phase of the situation which is not pleasing is that jobbers who are served from this center are well stocked and, therefore, cannot be interested by salesmen. This condition is particularly true of the south Atlantic States. Steel bars are quoted at 1.15c., Pittsburgh base, or 1.30c., Philadelphia. Iron bars can be had from nearby makers at 1.12c., Philadelphia.

Plates.—The demand for plates continues irregular, one maker reporting an increase in miscellaneous orders, while others find business extremely slow. The maker referred to received a goodly number of miscellaneous orders in the latter part of last week and again on Monday of this week, some of which came from consumers who had not been heard from in the last three months. For a fair-sized lot 1.25c., Philadelphia, would be readily accepted and it is not improbable that this figure might be shaded.

Structural Material.—For what is described as a smart lot of plain shapes 1.25c., Philadelphia, would be taken, although local sellers continue to quote 1.30c. Production operation in eastern Pennsylvania mills is not far from 50 per cent. of capacity. In this territory there are no noteworthy propositions in sight. As for the railroads, they are taking only what necessity compels and this is confined to small bridges.

Billets.—The quotation is unchanged at \$21.40 on the basis of \$19, Pittsburgh, for open-hearth rolling billets and demand of every sort is quiet. The quotation for forging steel is \$4 higher than for rolling billets.

Sheets.—Producers continue to quote 1.40c., Pittsburgh, or 1.55c., Philadelphia, for No. 10 blue annealed sheets, though they admit that outside of this territory business is being done on the basis of 1.35c., Pittsburgh. The demand is light.

Coke.—Small sales alone constitute what activity there is. Quotations are around \$1.60 per net ton at oven for prompt furnace coke and \$2.15 to \$2.50 for prompt foundry. Freight rates to this city from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

Old Material.—Despite the absence of buying, dealers assert that a better feeling exists. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$9.25 to	\$9.50
Old steel rails, rerolling.....	11.50 to	12.00
Low phosphorus heavy melting steel scrap	13.50 to	14.00
Old steel axles	13.00 to	13.50
Old iron axles	17.50 to	18.00
Old iron rails	13.00 to	14.00
Old carwheels	9.50 to	10.00
No. 1 railroad wrought	11.50 to	12.00
Wrought-iron pipe	9.50 to	10.00
No. 1 forge fire	8.00 to	8.50
Bundled sheets	8.00 to	8.50
No. 2 busheling	7.75 to	8.25
Machine shop turnings	7.50 to	8.00
Cast borings	7.50 to	8.00
No. 1 cast	11.00 to	12.00
Grate bars, railroad.....	8.00 to	8.50
Stove plate	8.00 to	8.50
Railroad malleable	9.00 to	9.50

Cleveland

CLEVELAND, OHIO, November 10, 1914.

Iron Ore.—In a few cases ore sold for 1914 delivery will not be shipped until next season, the sellers having agreed to postpone shipments, but having declined to accede to the request of the buyers that a portion of the ore they had purchased be cancelled. The shipping season is over with the exception of a few scattering cargoes that will be loaded in the next few days. The last ore cargoes of the Pittsburgh Steamship Company have reached Lake Erie ports. We quote prices as follows: Old range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; old range non-Bessemer, \$3; Mesaba non-Bessemer, \$2.85.

Pig Iron.—The market is beginning to take on some life, there being more inquiries than for several months. With the end of the year not far away and the prevailing low prices, there are indications that a moderate buying movement will soon be under way for first-quarter or first-half requirements. Sales reported in Cleveland and near vicinity include 750 tons of No. 2 Southern and 950 tons of Ohio silvery for first half. The latter sale, made on the basis of \$16 at furnace, establishes the current market price for this iron as the price for first half. Recent prices on foundry iron for Cleveland delivery are not being maintained, and No. 2 foundry can now be bought from a local furnace at \$13.25, delivered. For outside shipments the quotation is unchanged at \$12.75. Southern foundry is being sold at \$10, Birmingham, for delivery through first half. A Cleveland interest reports several inquiries aggregating about 12,000 tons, mostly for basic. An inquiry has reached the Cleveland market from a steel plant in England for 3000 to 4000 tons of steel-making iron per month with a maximum of 0.05 in phosphorus and sulphur, the prospective purchaser expressing its willingness to pay about 60s. (\$14.60) American seaboard. We quote, delivered Cleveland, as follows:

Bessemer	\$14.70
Basic	13.45
Northern No. 2 foundry.....	\$13.25 to 13.75
Southern No. 2 foundry.....	14.00
Gray forge	13.00
Jackson Co. silvery, 8 per cent. silicon.....	17.62
Standard low phos., Valley furnace.....	20.00

Coke.—The sale of some standard furnace coke on cars is reported at 1.50c. per net ton at oven, but the usual quotation is 1.60c. Generally the market is quiet. Sales of foundry coke are limited to small lots for early shipments which are being made at 2.25c. to 2.35c. for the better grades.

Finished Iron and Steel.—Sentiment in the steel trade has improved somewhat, but business shows little change for the better, and prices are weak. Orders are almost entirely for small lots. Plates are selling as low as 1.05c., Pittsburgh, for desirable orders, but the general quotation is 1.10c. The minimum quotation on steel bars and structural material is 1.10c. Low prices on iron bars are taking some of the business that usually goes to the steel mills. On iron bars Western mills are making prices down to 0.95c. at mill. There is some inquiry for first-quarter contracts for steel bars, on which 1.15c. is being quoted. A Cleveland maker has taken an order for 25,000 steel barrels for export to one of the countries at war, which will require about 900 tons of No. 16 black sheets. These will be furnished by a Youngstown mill. The finishing department of the Upson Nut Company, which has been shut down, has resumed operation. In structural lines the Bellefontaine Bridge & Steel Company has taken 500 tons for a shop to be built by the St. Mary's Machine Company, St. Mary's, Ohio, at St. Charles, Mo., and the McClintic-Marshall Construction Company has taken 150 tons for the filtration plant buildings in Cleveland. The general contract for the Lindner Building, Cleveland, has been placed with the Crowell-Lundoff-Little Company, Cleveland, and the general contract for the Western Reserve Bank building in Warren has been placed with the George A. Fuller Company. Corrigan, McKinney & Co. have taken bids for 1000 tons for coke and ore bins. A Cleveland traction line has released an order for 165 tons of standard rails placed a few months ago and afterward held up. The demand for sheets is not active and prices are weak. We quote black sheets at 1.90c., Pittsburgh, for No. 10; galvanized, 2.85c. for No. 10, and blue annealed, 1.35c. for No. 10. These prices have been shaded about \$1 a ton. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—The demand is dull and prices are weak, but there is a better sentiment in the market. Rivet quotations are 1.50c. for structural and 1.60c. for boiler rivets. These prices are being shaded \$1 a ton for carload lots. We quote discounts as follows: Common carriage bolts, $\frac{3}{4}$ x 6 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h.p. nuts, $\frac{3}{4}$ x 4 in., smaller or shorter, rolled thread, 80 and 25 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 25 per cent.; square h.p. nuts, blank or tapped, \$6.30 off; hexagon h. p. nuts, blank or tapped, \$7.20 off; c. p. c. and t. square nuts, blank or tapped, \$6 off; hexagon $\frac{5}{8}$ in. and larger, \$7.20 off; 9/16 in. and smaller, \$7.80 off; semi-finished hexagon nuts, $\frac{5}{8}$ in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—There is a better sentiment in the scrap market, but the current demand shows no improvement. However, some consumers are showing a willingness to buy for December and January delivery, provided they can do so at the prevailing low prices. A Sharon mill is reported to have purchased 1500 tons of heavy melting steel from the Pennsylvania Lines for that delivery at \$10.25. Local transactions in heavy melting steel are entirely between dealers, some sales being made at \$8.75 to \$9. Cast scrap and railroad wrought have declined 50c. a ton. Other prices are unchanged. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Old steel rails, rerolling.....	\$11.00 to \$11.75
Old iron rails	12.00
Steel car axles	11.75 to 12.00
Heavy melting steel	8.75 to 9.25
Old carwheels	10.75 to 11.00
Relaying rails, 50 lb. and over.....	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	9.50 to 10.00
Light bundled sheet scrap.....	7.50 to 8.00

	Per Net Ton
Iron car axles	\$16.75 to \$17.00
Cast borings	5.50 to 5.75
Iron and steel turnings and drillings	5.00 to 5.25
Steel axle turnings	6.00 to 6.25
No. 1 busheling, new	8.00 to 8.25
No. 1 busheling, old	7.75 to 8.00
No. 1 railroad wrought	9.00 to 9.50
No. 1 cast	9.25 to 9.75
Stove plate	7.50

Cincinnati

CINCINNATI, OHIO, November 11, 1914.—(By Wire.)
Pig Iron.—Regardless of political affiliations, all business men are relieved that the elections are over. Many manufacturers believe that there will now be a steady improvement in all lines. To a certain extent this better feeling has been shown in the pig-iron trade. However, no large orders have been booked lately and the bulk of business is in small tonnages. Exceptions may be made concerning two sales of 1000 tons each of Southern iron to Ohio and Michigan melters. About 500 tons each of Southern foundry were taken by two northern Ohio melters for shipment in the next five months. Producers in the Hanging Rock district are confronted with a 5 per cent. increase in freight rates to Central Freight Association territory, while many rates from Birmingham territory are being adjusted to meet the recent reduction of 35c. per ton to points that were not included in the original ruling of the Interstate Commerce Commission. Southern foundry iron is now quoted at \$10, Birmingham, and Northern iron at \$13, Ironton, for either first quarter or first half. While some business is being booked that does not come to light, the record for the past month is considerably under the average. The encouraging feature of the situation concerns the light stocks on hand that are held by both the foundries and rolling mills. Some Lake Superior charcoal iron has been bought lately and it is understood that additional tonnages are under negotiation that would make a fair average for the last quarter if the orders are placed promptly. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$13.40 to \$13.90
Southern coke, No. 2 f'dry and 2 soft.	12.90 to 13.45
Southern coke, No. 3 foundry	12.40 to 12.90
Southern No. 4 foundry	11.90 to 12.40
Southern gray forge	11.40 to 11.90
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.26 to 15.76
Southern Ohio coke, No. 2	14.26 to 14.76
Southern Ohio coke, No. 3	14.01 to 14.26
Southern Ohio malleable Bessemer	14.51 to 15.01
Basic, Northern	15.25 to 17.25
Lake Superior charcoal	26.90 to 27.40
Standard Southern carwheel	

(By Mail)

Coke.—A few carloads of foundry coke are being ordered for prompt shipment by foundrymen who are using more coke than their contracts call for, this demand being principally from jobbing firms busy on machine-tool castings. The stove foundries are not taking all due them on old contracts. Connellsville foundry coke is quoted all the way from \$2 to \$2.40 per net ton at oven, but the average contract figure is around \$2.25. Connellsville furnace coke is quoted at \$1.60 at oven for prompt shipment, although a number of carloads have been disposed of at \$1.50. Contract quotations range from \$1.60 to \$1.70. Wise County and Pocahontas operators are endeavoring to maintain prices about 10c. to 15c. higher than the above mentioned figures.

Finished Material.—The recent change in freight rates from Pittsburgh has been somewhat confusing. The quotation, Pittsburgh basis, on No. 28 black sheets, f.o.b. Cincinnati, or Newport, Ky., is 2.05 8/10c. per lb., but mills in this territory are understood to be quoting 2.06c., with No. 28 galvanized sheets at 3.06c. There is very little new business, but specifications on old contracts are coming in at a fairly satisfactory rate. Store prices on steel bars and small structural shapes remain around 1.80c. Hoops and bands are very quiet. It is reported that a Central Western railroad will make purchases of a lot of track material at an early date.

Old Material.—The foundries have lately been buying more scrap, but the larger users—the rolling mills—

have been indifferent customers. The offerings from the railroads are large, and prices quoted are subject to change on all transactions. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio, and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

	Per Gross Ton
Bundled sheet scrap	\$6.00 to \$6.50
Old iron rails	10.75 to 11.25
Relaying rails, 50 lb. and up	19.50 to 20.00
Rerolling steel rails	9.75 to 10.25
Melting steel rails	8.50 to 9.00
Old carwheels	9.50 to 10.00
Heavy melting steel	8.25 to 8.75

	Per Net Ton
No. 1 railroad wrought	\$7.75 to \$8.25
Cast borings	3.75 to 4.25
Steel turnings	3.75 to 4.25
Railroad cast scrap	9.00 to 9.50
No. 1 machinery cast scrap	9.75 to 10.25
Burnt scrap	5.75 to 6.25
Old iron axles	14.25 to 14.75
Locomotive tires (smooth inside)	9.00 to 9.50
Pipes and flues	5.75 to 6.25
Malleable and steel scrap	6.75 to 7.25
Railroad tank and sheet scrap	4.75 to 5.25

Buffalo

BUFFALO, N. Y., November 10, 1914.

Pig Iron.—According to some producers, there are indications that the turn will soon be reached. The total of sales reported by furnacemen is, however, less than reported for the previous week, amounting to about 6000 tons—all grades. A few sales are reported for delivery in first quarter of 1915. We continue last week's prices for delivery over remainder of this year, f.o.b. furnace:

No. 1 foundry	\$12.50 to \$12.75
No. 2 X foundry	12.00 to 12.50
No. 2 plain	12.00 to 12.50
No. 3 foundry	12.00 to 12.50
Gray forge	12.25 to 12.50
Malleable	13.25 to 13.75
Basic	16.25 to 17.25
Charcoal, regular grades and analysis	20.50
Charcoal, special grades and analysis	

Finished Iron and Steel.—Orders are still light, but agencies report the outlook brighter. Prices are pretty firmly represented by 1.15c. Pittsburgh, but it is believed that desirable specifications for bars and shapes in carload lots for immediate shipment can be done at 1.10c. base. Not much interest is being shown by purchasers in contracts for next year. The Lackawanna chasers in contracts for several hundred tons of bridge material for the Erie Railroad and about 250 tons of structural material for export to Cuba. The Buffalo Structural Steel Company has 100 tons for the American Glove Company, Dunkirk, and for about the same quantity for the German Lutheran Hospice, Buffalo. Contracting engineers Lupfer & Remick, Buffalo, have about 450 tons in Erie Canal contracts, including 150 tons at Syracuse.

Old Material.—The market remains extraordinarily dull. Prices have reached the lowest level in the recent history of the trade in this district. We quote dealers' selling prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	\$9.00 to \$9.50
Low phosphorus steel	12.50 to 13.00
No. 1 railroad wrought scrap	9.00 to 9.50
No. 1 railroad and machinery cast	9.25 to 9.75
Old steel axles	11.00 to 11.50
Old iron rails	16.00 to 16.50
Old carwheels	9.50 to 10.00
Railroad malleable	8.50 to 9.00
Machine shop turnings	5.25 to 5.75
Heavy axle turnings	7.50 to 8.00
Clean cast borings	5.00 to 5.50
Old iron rails	10.50 to 11.00
Locomotive grate bars	8.00 to 8.50
Stove plate (net ton)	8.00 to 8.50
Wrought pipe	6.50 to 7.00
Bundled sheet scrap	5.75 to 6.25
No. 1 busheling scrap	7.00 to 7.50
No. 2 busheling scrap	5.00 to 5.25
Bundled in scrap	10.00

Lupfer & Remick, contracting engineers, Buffalo, have received contracts in connection with Erie Barge Canal contracts G. and M. for work and material on Locks between Seneca Falls and Waterloo as follows: For contract G, 150 tons of machinery, 175 tons of iron

castings and 200 to 250 tons of structural steel. For contract M, 150 to 200 tons of machinery, 125 tons of iron castings, and a small tonnage of structural steel. The metal and machinery required are for valves, lock gates and operating machinery. The aggregate amount of the contract is about \$120,000, of which about one-half is for machinery.

Birmingham

BIRMINGHAM, ALA., November 9, 1914.

Pig Iron.—Scattering sales of carloads and of 200 to 500 tons at the uniform figure of \$10 have been made, but otherwise business is stagnant. The list of idle furnaces will probably be increased. Shipments are below the make. Hold-up orders continue to come in. No interest claims to be shipping more than two-thirds of its output. Special effort will be made to secure a lower freight rate to Mobile to take advantage of the new steamship line plying between that port and San Francisco. The 1000-ton order of special iron for the Pacific coast depends upon lower freight arrangements. The call for basic iron for home consumption is again declining on account of a return to only partial operations in the wire and rail mills. No foreign business has been booked that is openly reported. It is, however, understood that makers are becoming reticent as to foreign orders on account of danger to shipping from hostile war vessels. We quote, per gross ton, f.o.b. Birmingham district furnaces, for the rest of the year and first quarter of 1915 (the last figure being for exceptionally good iron) as follows:

No. 1 foundry and soft.....	\$10.50 to \$10.75
No. 2 foundry and soft.....	10.00 to 10.25
No. 3 foundry.....	9.50 to 9.75
No. 4 foundry.....	9.25 to 9.50
Gray forge.....	9.00 to 9.25
Basic.....	10.00 to 10.25
Charcoal.....	23.50 to 24.00

Cast-Iron Pipe.—Manufacturers report a continuance of operations at about 70 to 80 per cent. and a variety of orders, for water pipe in particular. One was for 10 cars from Omaha. There is prospect of some pipe moving to Cuba and some sanitary pipe is going to San Francisco soon. Two idle sanitary pipe shops in the Gadsden district have resumed on partial operations owing to a slight improvement in conditions. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., \$20; 6-in. and upward, \$18.

Coal and Coke.—The closing of the American Sugar Refining Company's plants at New Orleans and some other industries have cut off a portion of the demand for steam coal from this district. The presence of additional ships on the Gulf has increased the bunker business. Coke is dull and prices are shaded even in face of the decreased output. Good foundry coke can now be had at \$3 to \$3.25 per net ton at oven, with furnace coke selling at \$2.75 to \$2.80.

Old Material.—Light cast is moving in small quantities, but general trade is listless. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles.....	\$13.00 to \$13.50
Old steel axles.....	12.50 to 13.00
Old iron rails.....	12.00 to 12.50
No. 1 railroad wrought.....	8.50 to 9.00
No. 2 railroad wrought.....	7.50 to 8.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.00 to 7.50
No. 1 machinery cast.....	9.50 to 10.00
No. 1 steel scrap.....	8.00 to 8.50
Tram carwheels.....	8.50 to 9.00
Stove plate.....	8.00 to 8.50

Boston

BOSTON, MASS., November 10, 1914.

Old Material.—New England foundries that serve the shops of the machine-tool builders are more active and their buying of scrap is correspondingly greater, but the steel mills are taking very little material. The dealers look for a gradual improvement, believing that the extreme low level has been reached. Prices are unchanged. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania

points. Mill prices are approximately 50c. per ton higher.

Heavy melting steel.....	\$7.00 to \$7.25
Low phosphorus steel.....	13.75 to 14.25
Old steel axles.....	12.75 to 13.25
Old iron axles.....	20.25 to 20.75
Mixed shafting.....	12.00 to 12.25
No. 1 wrought and soft steel.....	8.25 to 8.50
Skeleton (bundled).....	5.50 to 5.75
Wrought-iron pipe.....	7.00 to 7.50
Cotton ties (bundled).....	5.25 to 5.75
No. 2 light.....	3.25 to 3.75
Wrought turnings.....	5.00 to 5.50
Cast borings.....	5.00 to 5.25
Machinery cast.....	10.75 to 11.00
Malleable.....	7.50 to 7.75
Stove plate.....	7.00 to 7.50
Grate bars.....	5.25 to 5.50

St. Louis

ST. LOUIS, MO., November 9, 1914.

Pig Iron.—There are pending at the present time an inquiry for 1000 tons of No. 2 Southern iron, one for 1000 tons of Nos. 2 and 3 Southern coupled with one for 200 tons of No. 2 Northern and also one for 250 tons of No. 2 Southern. The largest sale of the week was of 250 tons of Southern.

Coke.—The chief development of interest was a sale of 12,000 tons of by-product coke from the local gas plant to an Omaha, Neb., smelter at a price withheld. It was the first sale of this character to be made since the entry of the gas company into this field and it is understood that a favorable price was made. By-product coke from other points is quotable at this point at a little below the Connellsville oven figure plus the \$2.80 freight rate.

Finished Iron and Steel.—A slightly better demand is noticeable in the movement from warehouse stocks. Some interest attaches locally to the announced intention of the St. Louis Board of Improvements to ask soon for bids for the completion of the municipal bridge requiring about \$1,250,000 of steel. Some reinforcing material will be needed for \$2,500,000 sewer work. Quotations for stock out of warehouse are as follows: Soft steel bars, 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plates, 1.80c.; No. 10 blue sheets, annealed, cold rolled, 2c.; No. 28 black sheets, 2.55c.; No. 28 galvanized sheets, black sheet gauge, 3.55c.

Old Material.—Dealers are getting railroad scrap at almost the cost of picking up, loading and transportation, and those with money are laying it up in their yards against improvement in times. Prices, particularly of steel scrap, show a weaker tendency, the steel being affected by the announced intention of local industries to close December 1. We quote dealers' prices, f.o.b. St. Louis, nominally as follows:

Per Gross Ton	
Old iron rails.....	\$10.50 to \$10.75
Old steel rails, rerolling.....	9.50 to 10.00
Old steel rails, less than 3 ft.....	10.00 to 10.25
Relaying rails, standard section, subject to inspection.....	21.00 to 23.00
Old carwheels.....	10.50 to 10.75
No. 1 railroad heavy melting steel scrap.....	9.00 to 9.25
Shoveling steel.....	7.50 to 8.00
Frogs, switches and guards cut apart.....	9.00 to 9.25
Bundled sheet scrap.....	4.25 to 4.50

Per Net Ton	
Iron angle bars.....	\$9.50 to \$10.00
Steel angle bars.....	8.00 to 8.25
Iron car axles.....	16.25 to 16.75
Steel car axles.....	11.00 to 11.25
Wrought arch bars and transoms.....	10.50 to 11.00
No. 1 railroad wrought.....	7.50 to 7.75
No. 2 railroad wrought.....	7.50 to 7.75
Railroad springs.....	8.00 to 8.25
Steel couplers and knuckles.....	8.00 to 8.25
Locomotive tires, 42 in. and over, smooth.....	8.25 to 8.75
No. 1 dealers' forge.....	7.25 to 7.75
Mixed borings.....	3.50 to 3.75
No. 1 busheling.....	6.75 to 7.00
No. 1 boilers, cut to sheets and rings.....	5.25 to 5.75
No. 1 cast scrap.....	9.00 to 9.50
Stove plate and light cast scrap.....	7.75 to 8.25
Railroad malleable.....	7.50 to 7.75
Agricultural malleable.....	7.00 to 7.50
Pipes and flues.....	5.00 to 5.50
Railroad sheet and tank scrap.....	5.00 to 5.25
Railroad grate bars.....	6.25 to 6.50
Machine shop turnings.....	4.25 to 4.50

The Falk Company, Milwaukee, Wis., maker of Wuest herringbone gears, has established an office at 1024 Park Building, Pittsburgh, in charge of W. O. Beyer.

New York

NEW YORK, November 11, 1914.

Pig iron.—A sale of 1000 tons of foundry iron in New England was made in the latter part of last week and early this week 500 tons was sold to a New Jersey foundry. Deliveries are in the first quarter of 1915. Prices recently made on prompt shipments are duplicated in these 1915 transactions. While a slightly better feeling is noticed since the election, it has not expressed itself in any distinct increase in business. Foundry iron rather than basic or malleable is called for in pending inquiries. Sales are generally spoken of as of 100-ton and 200-ton lots, though in a number of cases larger amounts have been involved in sales of which little is generally known. The sales of \$12 Buffalo iron—and this figure has been slightly shaded—have set prices for Eastern furnaces for the first quarter of 1915, and seem to point to the continuance of the present low level for some time. In eastern Pennsylvania one furnace is about to go out and a smaller one is blowing in this week. Recent bargain counter transactions have included some Southern iron for pipe works. One inquiry now before the trade calls for iron for a sanitary pipe works. It is understood that the 250 tons wanted by the International Steam Pump Company for its Hazleton, Pa., plant has not yet been bought. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$14.25 to \$14.75; No. 2 X, \$14 to \$14.25; No. 2 plain, \$13.75 to \$14. Southern iron is quoted at \$14.50 to \$14.75 for No. 1 and \$14.25 to \$14.50 for No. 2.

Ferroalloys.—American representatives of English ferromanganese producers were notified by cable Tuesday that exports of the alloy from Great Britain are prohibited until further notice. Though not so stated, it is inferred that a government embargo has been enforced. A week ago information to this effect was received by cable in this country, but it was then discredited by New York representatives of English companies. The cause of this action is variously interpreted. By some it is regarded as the British government's method of stopping reexports of the alloy from this country, as some resale lots are known to have been disposed of by brokers and others to foreign countries, and it has been surmised that its ultimate destination might be Germany. Another opinion is that this sudden action is caused by a desire on the part of England to conserve her supplies. The domestic market has been quiet and dull with nominal quotations at \$68, seaboard. It is probable that some resale lots have been disposed of at lower prices. The effect of the virtual embargo is variously estimated and the future is regarded with interest, though at the present low rate of consumption famine talk excites little response. Ferrosilicon, 50 per cent., is inactive at \$71 to \$73, Pittsburgh.

Finished Iron and Steel.—The business closed in structural lines again exceeded the volume of fresh inquiries, and on the whole the week has been the duller so far. This applies even to export business, where there has been a diminution in the tangible offerings from the warring nations. An increase from these sources is expected in barb wire and the passing of another week brings producers here that much nearer expected purchases of rails, for example, especially light rails, and railroad cars. It is interesting that four large consumers of German alloy steels for automobiles and springs have placed the business with a Syracuse mill now operating at 100 per cent. capacity. About the only encouraging feature is a steady run of the smaller projects, which continue in fair volume. They are in themselves not large enough to affect prices and to such a degree is it a buyers' market that a 1.10c., Pittsburgh basing for structural material and bars is the admitted quotation which would be made for even slightly attractive business. In the absence of definite information of transactions below 1.15c., Pittsburgh, except special cases and those involved in some recent large structural awards, quotations are left at last week's prices with the notation that they could be shaded with an attractive offering. The American Bridge Company is operating in the East at 85 per

cent. capacity, a fact which is taken to indicate how large a factor in this market has been the volume of structural work for the New York City transportation lines. Among structural awards may be mentioned 2000 tons for a highway bridge at Portland, Me., believed to have gone to the Phoenix Bridge Company; 500 tons for two bridges for the New Haven at New London, to the American Bridge Company; 350 tons for an apartment house, Ninety-sixth street and West End avenue, to the Bethlehem Steel Company; 400 tons for a subway approach to the Newark terminal and 200 tons for a traveling-belt coal handling plant for a power house, both the Hay Foundry & Iron Works, and 200 tons for the Massachusetts Homeopathic Hospital, Boston, to the New England Structural Company. Some 2700 tons additional work has also been closed for the Barge Canal and 100 tons for a garage at Lake Placid, N. Y. and 150 tons for a warehouse in New York. About the only new projects of size coming to light are a Y. M. C. A. building, Bowery, New York City, 300 tons, and bridge work at Johnstown, Pa., for the Pennsylvania, 300 tons. In plates some 300 tons will be required for caisson locks for the Flinn-O'Rourke Company and about 600 tons for car floats for the Lehigh Valley. Nothing new has come before the car builders and the only award learned of is 24 electric passenger cars for the Southern Pacific to be built by the Pressed Steel Car Company. We quote mill shipments of steel bars and shapes at 1.15c., Pittsburgh, or 1.31c., New York; steel plates at 1.10c to 1.15c., Pittsburgh, or 1.26c. to 1.31c., New York, and iron bars at 1.20c. to 1.25c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plate and structural material at 1.85c. to 1.90c.

Cast-Iron Pipe.—Wappinger's Falls, N. Y., will open bids November 18 on 662 tons of 4, 6, 8 and 10 in. Bids are asked on other small lots by various municipalities but none of them is of sufficient importance to mention. No decision has yet been made regarding the successful bidder on 1400 tons of 30-in., on which proposals were opened by the city of Troy, N. Y., November 6. An interesting development of the pipe market is the appearance of inquiries from some of the shrewdest buyers for prices for spring delivery. It is considered improbable that anything like current prices will be named at this time for such shipment. Foreign inquiries continue to be received but do not develop into orders. The situation with regard to private buying is normal for the season but no improvement can yet be observed with regard to prices. Carload lots of 6-in. are quoted at \$20 to \$20.50, per net ton, tidewater.

Old Material.—Scattered sales of small quantities constitute the only transactions in old material now being consummated. Inquiries are almost wholly lacking. Consumption is at a minimum in foundries, rolling mills and steel works. Notwithstanding the extreme dullness, a spirit of hopefulness is appearing among dealers, who believe that the stagnant condition of trade cannot last much longer. Dealers' quotations are continued as follows, per gross ton, New York:

Old girder and T-rails for melting	\$7.00 to \$7.25
Heavy melting steel scrap	7.00 to 7.25
Relaying rails	19.00 to 19.50
Rerolling rails	8.00 to 8.25
Iron car axles	14.00 to 14.25
Steel car axles	10.00 to 10.50
No. 1 railroad wrought	8.50 to 9.00
Wrought-iron track scrap	8.00 to 8.50
No. 1 yard wrought, long	8.00 to 8.50
No. 1 yard wrought, short	7.00 to 7.25
Cast borings	5.50 to 6.00
Wrought turnings	5.00 to 5.50
Wrought pipe	7.00 to 7.25
Carwheels	8.50 to 9.00
No. 1 heavy cast, broken up	9.50 to 10.00
Stove plate	7.25 to 7.50
Locomotive grate bars	6.00 to 6.50
Malleable cast	6.50 to 7.00

The American Railway Association's statement of car surpluses and shortages as of November 1 shows total surplus 172,325 cars, against 154,342 October 15 and a shortage of 2229, against 2360 October 15. These figures make the net surplus 170,096 cars November 1, against 151,982 October 15. The surplus is now the largest for November since records were kept.

Ferromanganese Embargo

British Order Evidently Due to Resales—American Tin Plates Sold to Japan

(By Cable)

LONDON, ENGLAND, November 11, 1914.

The pig-iron situation is unaltered, with very little doing. Furnaces in blast, 165, against 185 last year. Pig-iron stocks are 104,167 tons; last week, 104,991 tons. Hematite iron is easy. Ferromanganese exports are now prohibited entirely, though possibly concessions may be made if satisfactory guarantees are forthcoming against resale for shipment to Europe. Meantime exports of manganese ore from India continue forbidden except to Great Britain and France. Semi-finished steel is very quiet and featureless. Finished steel is moderately steady, but not much is doing except in connection with national purposes. Better inquiries have come out for tin plates and the market is a shade steadier. Australia and British Columbia are inquiring. American mills have taken 35,000 boxes of quarters for Japan, shipments in December and January, at less than 13s. (\$3.16) f.o.b. We quote as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 7½d. (\$3.07).

Cleveland pig-iron warrants (Tuesday), 49s. 2d. (\$11.96), against 49s. 2½d. (\$11.97) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 49s. 9d. (\$12.10), the same as last week.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 15s. (\$42.58).

Steel ship plates, Scotch, delivered local yards, £6 15s. (\$32.84).

Steel rails, export, f.o.b. works port, £6 2s. 6d. (\$29.80).

Hematite pig iron, f.o.b. Tees, 61s. 9d. (\$15.03), against 62s. (\$15.09) last week.

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 15s. (\$23.12).

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £6 7s. 6d. (\$31.02).

Steel bars, export, f.o.b. Clyde, £7 (\$34.06).

Metal Market

NEW YORK, November 11, 1914.

The Week's Prices

		Cents Per Pound for Early Delivery					
Copper, New York		—Lead—		—Spelter—			
		Electro-	Tin,	New	St.	New	St.
Nov.	Lake	lytic New York	New York	York	Louis	York	Louis
4.....	11.50	11.25	33.25	3.50	3.49	5.00	4.85
5.....	11.50	11.25	33.85	3.50	3.40	5.00	4.85
6.....	11.50	11.25	34.12½	3.50	3.40	4.95	4.80
7.....	11.50	11.25	.....	3.50	3.40	4.95	4.80
9.....	11.50	11.25	34.25	3.50	3.40	4.95	4.80
10.....	11.50	11.25	34.25	3.50	3.40	4.95	4.80

Copper is quiet and the price unchanged. Tin is higher but shows an easier tendency. Lead is stronger though the market is less active. Spelter is lower and weak. Antimony is firm.

New York

Copper.—The market has been quiet. The export situation is practically unchanged, England adhering to her determination not to permit metal to reach German or Austrian territory. The Italian Government has prohibited the export of copper from Italy, but not its transit through Italy to a foreign country. Copper consigned for Italian use will not be subject to seizure and the metal also may be sent to Switzerland when the proper assurances are given, but that which is sent subject to order will be under suspicion. The electrolytic quotation throughout the week has been 11.25c., cash, New York, or 11.37½c., 30 days, delivered. Some resale lots have come out at concessions of 5 to 7½ points, but these were soon absorbed, after which quotations steadied at the price given above. Lake can be had at 11.50c. which is regarded as a reasonable figure and some producers are known to have done a good business with ammunition manufacturers. Exports from the United States in 10 months of this year, as

compiled by C. Mayer, secretary of the New York Metal Exchange, total 313,064 tons against 322,399 tons in 1913.

Tin.—Buying was good until November 6, after which the market was quiet until yesterday when activity again developed. Nearly all of the demand was for future deliveries which ran well ahead and was actuated by fear of a shortage in the future supply. With the news that the German cruiser Emden was out of the way anxiety became less and the demand fell off. There is now some assurance that shipments from the Far East will come more freely. On November 4 the range of prices was from 33c. to 33.50c., on November 5 from 33.62½c. to 34c., and on November 6, 34c. to 34.25c. The October statistics show a decrease of 3558 tons in the total visible supply, which on October 31 was reported as 10,894 tons. Arrivals this month total 560 tons and there is afloat 1760 tons. The New York Metal Exchange resumed dealing in tin, lead and spelter on November 9. A sale of 850 tons of Banca tin was scheduled for public sale on November 10 but was withdrawn.

Lead.—The recent heavy buying has subsided, but its effects are still felt and the New York market is strong, while that at St. Louis has advanced a few points. Consumers have been willing to pay a premium for shipment next year and surprise is expressed that the large interest has not advanced its prices. The quotation in New York yesterday was 3.50c. and that at St. Louis, 3.40c.

Spelter.—Under a lessened demand the market is weaker at 4.95c., New York, and 4.80c., St. Louis. There have been exports of high grade spelter but how much cannot be told until the figures are 30 days old, under the recent ruling of the Treasury Department.

Antimony.—Reports are current that Russian interests are again looking for antimony and those who have the metal are holding it to see what develops. Meanwhile prices are stronger at 17c. to 18c. for Cookson's, 15.50c. to 16.50c. for Hallett's and 13.50c. to 14.50c. for other grades.

Old Metals.—Conditions have not improved. Dealers' selling prices are nominally unchanged as follows:

	Cents per lb.
Copper, heavy and crucible.....	11.00 to 11.25
Copper, heavy and wire.....	10.75 to 11.00
Copper, light and bottoms.....	9.75 to 10.00
Brass, heavy.....	8.25 to 8.50
Brass, light.....	6.25 to 6.50
Heavy machine composition.....	10.50 to 10.75
Clean brass turnings.....	7.50 to 7.75
Composition turnings.....	9.25 to 9.50
Lead, heavy.....	3.25
Lead, tea.....	3.00
Zinc scrap.....	3.50

Chicago

NOVEMBER 9.—Quotations indicating further concessions in copper are reported, but buyers here state that they are unable to purchase at lower prices. The market for tin is quiet, but the metal is scarce and quotations have advanced. Influenced by the increasing exportations, lead prices also are firmer. We quote as follows: Casting copper, 11.75c.; Lake copper, 12c. for prompt shipment; small lots, ¼c. to ½c. higher; pig tin, carloads, 34.75c.; small lots, 35c.; lead, desilverized, 3.45c. to 3.50c. and corroding, 3.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 4.85c. to 4.90c.; Cookson's antimony, 20c. for cask lots; other grades, 16c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 10c.; copper bottoms, 8.50c.; copper clips, 9.50c.; red brass, 9c.; yellow brass, 6.50c.; lead pipe, 2.90c.; zinc, 3.50c.; pewter, No. 1, 24c.; tinfoil, 27c.; block tin pipe, 27c.

St. Louis

NOVEMBER 9.—Lead has remained quotably unchanged the past week at 3.35c., while spelter stands at 4.85c. to 4.90c., with some sales of considerable size. Tin is quotable at 36c.; Lake copper, 13c.; electrolytic copper, 12.90c.; Cookson's antimony, 16c. In the Joplin ore market there was a rather steady tendency at slightly lower figures for the lower grades, the basis

range for 60 per cent, being \$40 to \$45 per ton, with the choicest selling up to \$48. Calamine was rather quiet at \$20 to \$21, with the choicest as high as \$27. Lead ore showed a firmer feeling, advancing to \$42 for 80 per cent. Miscellaneous scrap metals are quoted as follows: Light brass, 5c.; heavy yellow brass, 7c.; heavy red brass and light copper, 8c.; heavy copper and copper wire, 9c.; pewter, 20c.; tin foil, 24c.; zinc, 3c.; tea lead, 3c.; lead, 3c.

Iron and Industrial Stocks

NEW YORK, November 10, 1914.

The financial situation steadily improves, and a further impetus in this direction is expected to be imparted with the opening of the Federal Reserve banks next Monday. The New York Stock Exchange, however, has not yet opened and no date has been fixed for this important event, although financial interests generally are becoming somewhat impatient at the prolongation of its inactivity.

Dividends

The Niles-Bement-Pond Company, regular quarterly, $1\frac{1}{2}$ per cent. on the preferred stock, payable November 16.

The Pratt & Whitney Company, regular quarterly, $1\frac{1}{2}$ per cent. on the preferred stock, payable November 16.

The Studebaker Corporation, regular quarterly, 1% per cent. on the preferred stock, payable December 1.

The American Smelting & Refining Company, regular quarterly, 1% per cent. on the preferred stock, payable December 1, and 1 per cent. on the common stock, payable December 15.

The American Radiator Company, regular quarterly, $2\frac{1}{2}$ per cent. on the common stock, payable December 31, and 1% per cent. on the preferred stock, payable November 16.

O'Halloran & Jacobs, Pittsburgh, dealers in roofing slate and slate products, have been awarded \$22,568 damages by the United States Circuit Court at Albany, N. Y., in a suit brought under the Sherman act against the American Sea Green Slate Company and other slate interests which it was alleged had combined to control 90 per cent. of the slate output of Vermont, the only State producing sea green slate. There was also a judgment of \$3041.59 for attorneys' fees and costs against the defendants. The case has been in litigation for five years, the plaintiff claiming injury to its business by reason of the combination.

The Link-Belt Company, Chicago, has issued a striking brochure relating to locomotive cranes of its manufacture. The contents of the pamphlet consist largely of excellent photographs of various types of cranes, for the most part taken with the cranes in service. The views are illustrative of the wide variety of uses to which these machines are adapted, and the photographs are in themselves so excellent that little additional explanation is necessary. The solution of a great many problems of handling materials may be found in a perusal of this interesting publication.

The commission-manager form of government and its relation to the engineering profession is to be discussed by Henry M. Waite, city manager, Dayton, Ohio, at a meeting held under the auspices of the Boston Society of Civil Engineers, at Boston, Mass., November 18.

The Vega Separator Company, Fostoria, Ohio, has been formed with a capital stock of \$25,000 to engage in the importation and distribution of cream separators made in Sweden. Among the incorporators are Alanzo Emerine, B. R. Yates and J. W. Lockhart.

The Kissel Motor Car Company, Hartford, Wis., has received orders for 25 $2\frac{1}{2}$ -ton trucks for export. This is the second order this company has filled for a foreign government.

The Lymn Gas-Producer System with By-Products Recovery

The Lymn process of producer-gas manufacture with by-products recovery was explained in part at a meeting of the American Society of Mechanical Engineers held in New York City Tuesday evening, November 10. A paper was read on the subject by Arthur H. Lymn, of London, England, who, with L. A. Riley, is now engaged in making the attempt to utilize a mine waste near Pittsburgh, where the hitherto discarded material runs 30 to 40 per cent. ash, 3 per cent. in sulphur and is highly caking. The speaker remarked in passing that the preliminary operations are encouraging. He briefly reviewed the development of large gas producer plant equipped to recover tar and to form sulphate of ammonia and described his own designs based on patents which he took out in 1908. He was formerly in charge of the South Staffordshire Mond Gas Company, at Dudley Port, England, but latterly has been engaged in Germany where a number of plants built in accordance with his plans have been in operation, notably one for four years, operating continuously at 98 per cent. capacity, at Ludwigshafen, and one at Dortmund. In the case of the former, with a coal cost of 14 marks (about \$3.50 per ton) electrical energy is obtained at a cost of 0.13 cent per kilowatt-hour.

Mr. Lymn's plants are chiefly noteworthy for the reduced heights of the gas-washing and gas-treating towers, compared with other designs of such plants, a fact calculated to mean lower first cost, other things being equal. It appears also that no lead lining is employed to prevent corrosion of the metal tower, and while the author admitted he was not trying to prove the insolubility of iron in sulphuric acid he vouchsafed no explanation of how it is he is able to dispense with the lead. He uses a producer with mechanically operated grate and mechanical removal of the ash and also a dry cleaner for separating dust from the gas before it is treated. In Germany his apparatus is built by Ehrhardt & Sehmer, Saarbrücken, and he mentioned two gas engines built by this firm for his work, of no less than 4500 hp. capacity each, two cylinders to each engine 4 ft. $4\frac{1}{2}$ in. in diameter and 4 ft. 7 in. stroke, operating at 94 r.p.m.

He deplored the fact that this country has not properly recognized the importance of recovering ammonia sulphate, to meet the demand for fertilizing material. The total annual consumption of ammonia sulphate in 1913 was 1,700,000 tons and of this the United States took 280,000 tons, part of which was imported, as it produced only about 220,000 tons. He felt that with an annual consumption of 25,000,000 tons of coal in this country it was proper to consider the recovery problems. He realized that the gas engine was not so popular here as abroad and that conditions of coal and other things must be considered, but he felt among other things that we build our gas engines too heavy. Parenthetically he paid a tribute to the United States Geological Survey for its remarkable investigations of the coals of this country. Among other points he dwelt on the consideration of the gas-producer plant as a producer of by-products, securing \$1.25 worth of by-products for \$1 worth of coal and utilizing the gas as a by-product. He mentioned instances of gas combustion under boilers such as that proposed by Prof. W. A. Bone, Leeds, England, as illustrating the possibilities of economies and that he had contracted to install a plant in Russia to gasify 90 tons of peat a day, although he could not say now when the work would be done.

An interesting point was brought out at the recent sales conference of the Goodyear Tire & Rubber Company, Akron, Ohio. The company's statistician announced that each of the 500 salesmen sells enough goods to keep 15 workmen on the payroll at Akron. The company employs 7500. Most of these are married, and the statistician figuring an average of two dependents per workman shows that Goodyear salesmen produce means of life for 22,500 Akron people.

Organizing and Managing a Foundry

Rules That Aid in Preventing Accidents—How to Avoid Clutter and Disorder—Suggestions for Pattern Storage

BY P. R. RAMP*

The efficiency of a foundry depends not only on a good shop organization, definite duties and responsibilities for each man and correct foundry practice, but to a large degree upon the elimination of loss from accident and delay.

PREVENTION OF ACCIDENTS

The following rules will to a large extent reduce injuries to workmen and loss of output to a minimum:

It is the duty of the general foreman and the foreman of every department to compel the men to use caution and good judgment in an effort to avoid accidents.

No molder, helper or apprentice should be allowed to walk backwards while carrying a ladle filled or partially filled with liquid metal.

No pig bed or flow-off basin, filled with molten metal, should be covered with sand to hide it, as there is great danger of some one stepping into it.

No one should be allowed to work under a large mold suspended from the crane, unless horses are placed to catch it, should the chain or cable break.

Men should be forbidden to ride on a core plate or a flask filled or empty, while suspended from or being moved by the crane.

Gangways and floors must be free at casting time from rubbish or tools lying around. Anything that can cause a man to trip or fall with his metal must be removed.

All skimmers or churning rods should be thoroughly dried before they are thrust into the molten metal.

Catching metal from the cupola spout should be prohibited without special permission, unless it is the regular practice and provisions have been made accordingly.

Waste metal must not be poured into metal ingots, as there is great danger of damp spots in the mold which cause explosions.

Scrap spilled on top of flasks should be taken off before the molds are shaken out, as it is dangerous to the hands, often causing blood poison.

Molders must not rub the riddlings through their riddle with the bare hand, as this often causes blood poison.

KEEPING THE SHOP CLEAN

A disorderly floor indicates something fundamentally wrong with the management. Clutter throughout the shop is a potent cause of loss in time and workmen's energies. Provision should be made to keep the shop clean. One man should be employed whose duty it is to clean up the gangway every morning, gather the rubbish and sand and separate the small particles of scrap iron from the sand. The sand and rubbish he should haul to the dump and deposit the small particles of scrap in a neat pile in the scrap yard. Besides cleaning up the gangway, he must keep rubbish cleaned up from around the entrances to the shop, maintain the toilet room in a clean and neat condition and report any defects in pipes, fixtures, etc.

*Works manager, the Quigley Furnace & Foundry Company, Springfield, Mass. In *The Iron Age*, November 5, the author discussed shop organization, duties of executives, foundry practice, etc.

After the gangway has been cleaned, employees should be prohibited from throwing riddlings, broken cores, or other rubbish into it. If such dirt is created by the molder in his work, he should be required to deposit it in a neat pile on his own floor near the gangway, where it will be handy for the clean-up man in the morning. Molders should not be allowed to dump an excessive quantity of sand on the rubbish pile, while taking the scrap from the tops of their molds. This refers to the scrap that is created by the metal spilling while pouring the mold.

Every molder or machine operator must keep his floor clean. There must be no rubbish or loose sand between floors. The foreman must lay out the division line between the floors. Clamps, gagers, nails, rods, etc., must be kept behind each floor and not beside it. Flasks should be piled in good shape behind the floor before the molder leaves the shop. Clay wash pots, rammers, shovels, riddles and other similar tools must be kept at the back of the molder's floor when not in use.

Every evening each molder must clean his own shovel. A failure to do this should be sufficient offense to justify his discharge. A dirty shovel and a dirty mold go hand in hand. Horses, follow boards and straight edges must be kept in places allotted them; and every molder using them should be required to return them to their proper place. After a molder has used a pattern he should brush it free from sand, clay wash or any other dirt that may be clinging to it.

The core benches in the core room must be cleaned up every night; and any extra sand left on the benches after the day's work is done must be returned to the sand bin. Idle core plates must be piled up in a neat and orderly manner. Core boxes for running jobs when not in use must be piled neatly in the proper place, with all loose pieces. After an order has been filled the core boxes must be brushed out clean and returned to the pattern storage. None of these boxes must be allowed to remain in the core room over night. Blacking pots and paste pots should have a proper place, where they must be kept. The core room floor must be swept clean every night, and more often if necessary. Chalking the oven doors should be forbidden. These doors ought to be kept painted. The foreman of the core department should be held responsible for the neat condition of the core room and the condition of the core boxes.

PATTERN STORAGE

Patterns must be stored with a view to locating them quickly.

Core boxes belonging to a pattern must be stored with it.

Patterns must be placed in their proper places as soon as they have been returned by the foundry.

Patterns must be laid out and tagged as they are ordered; the storage man ought to receive a copy of all foundry orders.

When a foundry order is received by the storage man he will at once make out a separate tag for each pattern and core box, writing on the tag in ink, the order number, the number wanted, the

name and number of pattern to which it is attached and the date of the order.

When a pattern is returned to the storage, the storage man must see that all the core boxes and loose pieces belonging to it are returned also.

The pattern storage should be required to report patterns coming from the foundry covered with sand or other objectionable material.

The pattern storage department ought to report to the works manager all injury to patterns or core boxes that are returned from the foundry.

It ought to report the condition of all patterns received from a customer.

The pattern storage should make all reports in writing, on proper blanks.

Patterns are to be taken from and returned to the storage by the foundry.

On order from the foundry the pattern storage man will devote any spare time he may have to repairing patterns or varnishing them.

The pattern storage man will open and lock the storage each day; will be responsible for the condition of the fire extinguishers and everything connected with the building.

Meeting of Mechanical Engineers

The American Society of Mechanical Engineers will hold its annual meeting in New York City, at the Engineering Societies Building, December 1 to 4, inclusive. Main emphasis is given to a group of papers to be read on Thursday, December 3, on the engineer in public service, under the general heading of "Engineering in the Administration of a City." For some of the other professional sessions the following programme is announced:

Wednesday morning, December 2: "Floor Surfaces in Fireproof Buildings," by Sanford E. Thompson, consulting engineer, Boston; "Reinforced-Concrete Factory Buildings," by F. W. Dean, mill engineer and architect, Boston.

Wednesday afternoon, December 2: "Measuring Efficiency," by H. L. Gantt, consulting engineer, New York City; "Standardization in the Factory," by C. B. Auel; "Operation of Grinding Wheels in Machine Grinding," by George I. Alden, president Norton Company and Norton Grinding Company, Worcester, Mass.; "Friction Losses in the Universal Joint," by P. F. Walker, professor of mechanical engineering University of Kansas, and W. J. Malcolmson.

Thursday afternoon, December 3: "Factors in Hardening Tool Steel," by Dr. John A. Mathews, general manager Halcomb Steel Company, Syracuse, N. Y., and Howard J. Stagg; "Standardization of Chilled Iron Crane Wheels," by F. K. Vial; "The Mechanical Elimination of Seams in Steel Products, Notably Steel Rails," by Capt. Robert W. Hunt, Chicago, and "Topical Discussion on Alloy Steels."

On Wednesday afternoon there is to be a separate session given over to railroad matters, including a report on "Steam Locomotives of To-day"; and on Friday morning, December 4, papers are to be read on a rate flow meter, a new volume regulator for air compressors, and the clinkering of coal.

The membership of the society has now passed 6000, the total membership on October 28 being 6004, representing an increase of over 12 per cent. in the past 10 months.

The Bridge and Structural Iron Workers' Union at St. Louis, November 2, returned voluntarily to the scale of 65c. per hour which prevailed before the last advance in wages. The notice sent out by officers of the union states that the voluntary reduction in wages has been made in the belief that it will tend to an increase in building activity. The opinion is also expressed by the officers that a similar movement in all lines would go far to renew industrial activity, now so generally stagnant because of the war.

Iron and Steel Wages and Hours

A report on wages and hours of labor in the iron and steel industry has just been published by the Bureau of Labor Statistics of the United States Department of Labor as its bulletin No. 151. The report is based on information obtained from the pay rolls of representative establishments. In three departments data are presented for the years 1907 to 1912 and in six other departments for 1910 to 1912. There was an increase of wages and a reduction of hours of work per week in the industry as a whole, though in certain departments the tendency toward higher wages and earnings and lower hours was not constant from year to year.

In blast furnaces the full-time weekly earnings in 1912 were 1.1 per cent. higher than in 1907, 7.3 per cent. higher than in 1908, 8.2 per cent. higher than in 1909, 0.3 per cent. higher than in 1910, and 0.6 per cent. lower than in 1911. In the Bessemer-converting departments in 1912 the full-time weekly earnings were 4.5 per cent. higher than in 1907, 14 per cent. higher than in 1908, 7.2 per cent. higher than in 1909, 2.6 per cent. higher than in 1910, and 7.5 per cent. higher than in 1911. In bar mills the full-time weekly earnings in 1912 were 2.3 per cent. lower than in 1907, 8.7 per cent. higher than in 1908, 6.3 per cent. higher than in 1909, 3.8 per cent. lower than in 1910, and 1 per cent. higher than in 1911. For the six other departments figures are shown only for the three years 1910, 1911, and 1912. In five of these, namely, the open-hearth, blooming, plate, sheet, and tin-plate departments, full-time weekly earnings were higher in 1912 than in either of the two preceding years. In the other one, standard rail mills, full-time weekly earnings were highest in 1910.

There was a reduction of hours of labor between 1907 and 1912 in the blast-furnace, Bessemer-converting, and bar-mill departments, and with the exception of plate mills each of the other departments of the industry shows a reduction of hours between 1910 and 1912. In blast furnaces the full-time hours per week were 3.9 per cent. lower in 1912 than in 1907, in Bessemer-converting 2.2 per cent. lower, and in bar mills 1.3 per cent. lower. In open-hearth furnaces the full-time hours per week were 0.8 per cent. lower in 1912 than in 1910, in blooming mills 0.6 per cent. lower, in standard rail mills 4.2 per cent. lower, in sheet mills 1.3 per cent. lower, and in tin-plate mills 0.4 per cent. lower, while in plate mills the full-time hours in 1912 were 0.3 per cent. higher than in 1910. In the establishments reporting there was a marked reduction in the proportion of employees customarily working seven days per week. This was made possible by the custom adopted in many plants of making provision to lay off one day per week each employee in the seven-day occupations—thus making a six-day week for those employees.

The Upton Machine Company, St. Joseph, Mich., maker of electric laundry machines, has purchased the business of the American Tool Works, St. Joseph, and will manufacture the latter company's line of air rifles. Louis C. Upton is vice-president and general manager of the combined companies. The name of the American Tool Works will be dropped, but its brand names will be continued.

The Firth-Sterling Steel Company, Demmler, Pa., is reported to have received an order for 20,000 3-in., 10,000 6-in. and 5000 8-in. shells, also an order for a considerable quantity of larger projectiles. The Economy Cartridge & Fuse Company, Pittsburgh, it is stated, has taken an order for 5,000,000 rounds of Mauser rifle ammunition.

The volume of unemployment in the iron and steel industries in Great Britain, according to the monthly report of the British Steel Smelters, Mill, Iron, Tin-plate and Kindred Trades was no more at the end of September than at the end of July and before the war. This condition is due chiefly to government requirements.

Concentration by the Goltra Process

Beneficiation of Brown Iron Ores by Means
of a Current of Hot Air and Properly Lo-
cated Screens—Fines Separated Magnetically

—BY WILLIAM B. PHILLIPS*

An investigation was undertaken to ascertain whether the Goltra process for the beneficiation of brown iron ores was applicable to these ores as they occur in Cass and Marion counties, Texas, and elsewhere throughout the iron ore fields of east and northeast Texas.

Ordinarily the beneficiation of brown ores is accomplished by log washers of the McClanahan-Stone type, with attached sand screens, or by means of more complicated and costly installations of ore concentrating machinery, crushers, jigs, etc. A large quantity of water is required in these operations, the amount varying from 500 to 1000 gallons per ton of material treated, according to its character. During the six years ending with 1912 the production of brown ore in the states of Alabama, Georgia, Tennessee and Virginia was more than 13 million tons and by far the greater proportion of this was handled by some washing process. The Goltra process proposes to dispense with the use of water and to clean the ore by means of a current of hot air and properly located screens.

The Goltra Process Described

The material from the bank of ore, containing ore, sand, clay, earth, chert, sandrock, etc., is fed into a steel cylinder partly lined with firebrick. This cylinder is 125 ft. long and 10 ft. in diameter. It is inclined $\frac{3}{4}$ in. to the foot and makes one complete revolution per minute. The travel of the material down and through this cylinder is at the rate of about two feet per minute, so that it reaches the lower end in from 45 to 60 min. after feeding.

At the lower end of the cylinder a blast of ignited pulverized coal is blown in by an Aero pulverizer, the fineness of the coal being from 80 to 100 mesh. At the upper end of the cylinder a large fan is installed, with a capacity of 35,000 cu. ft. of air per minute, and this draws the heated air through the cylinder and discharges it, with the fine dust into a dust-catcher. During the drying of the material the temperature of the lower part of the cylinder is kept at about 300 deg. F., the temperature at the upper end being about 200 deg. F., or even less.

The material is thus dried very slowly and completely, and during the drying the fine clay, sand, earth, etc., are swept out of the cylinder by the current of heated air. From this first cylinder the thoroughly dry material is sent to a gyratory crusher, set for 2 to 2½ in. From the crusher the material goes to a revolving three-size screen, the inner openings, punched round, being $\frac{3}{4}$ in. and the second screen, with round openings, being $\frac{1}{2}$ in. The outer screen has 1-16-in. slotted openings.

The material over the $\frac{3}{4}$ -in. screen is hand-picked on a picker belt and goes with all of the stuff, except such as passes the 1-16-in. outer screen, into storage bins. The material through the 1-16-in. outer screen goes into a reject bin.

A SECOND OR CALCINING CYLINDER

The material from the revolving screen, all sizes

above 1-16 in., is conveyed to a storage bin which discharges into a second cylinder 125 ft. long and 9 ft. in diameter, partly lined with firebrick. This cylinder has the same slope as the first cylinder and the same revolutions per minute. It is heated in the same manner as the first cylinder, but the temperature is much higher, so that the material reaches the lower end at a bright red heat, about 1000 deg. F. The heated air is drawn through this cylinder in the same manner as through the first cylinder and the fine dust, etc., is discharged into a dust chamber.

From the lower end of this second cylinder, which may be termed the calciner, as distinguished from the dryer, the red hot ore is screened over a revolving screen with $\frac{1}{2}$ -in. punched round holes. The "overs" from this screen are cooled and hand-picked over a picker belt and go direct to the loading bins above the railroad tracks. The red hot material through the $\frac{1}{2}$ -in. screen just mentioned goes to what is known as the reducer. This is a closely sealed steel cylinder in which the ore is sprayed with crude petroleum and rendered highly magnetic. From this reducer the magnetized fine ore goes to screens where it is classified to $\frac{1}{4}$ and 1-16 inch, these separate sizes being sent to Ball-Norton magnetic separators.

This, in brief, is the Goltra process. It is an air-washing process, instead of a water-washing process, and employs magnetization and magnetic separation of the fine material, instead of jigging it.

During the last several years the Missouri Iron Company has expended a great deal of money on this process for the purpose of bringing into use the deposit of brown ore at Waukon, Iowa. In order to test this process with reference to its adaptability to Texas brown ores, I was asked to take charge of a shipment of 338.69 tons from northeast Texas. The weight of the shipment received at Waukon does not tally exactly with the railroad weights at point of shipment, but as this difference amounted to only about 3 tons, it was not regarded.

Conduct of the Test

Each of the 14 cars was carefully sampled as it was being unloaded at Waukon, from 100 to 150 lb. being taken from each and the samples kept separate. Taking the average of the 14 samples the following is considered a correct statement of the composition of the 338.69 tons of ore received at Waukon:

	Per cent.
Iron	32.74
Silica	26.77
Alumina	6.65
Sulphur	0.041
Phosphorus	0.075
Free water	11.32
Combined water	8.70

Owing to the fact that only one of the cylinders was installed at the time of the test, we were obliged to dry the ore in the dryer and then haul it back up the hill and put it through the crusher before sending it to the calciner. Repeated handling of the ore caused some loss, but as the exact amount of this loss could not be ascertained, it has been included in "Estimated Losses." The theoretical

*Condensed from the report of a test made by the author to Edward F. Goltra, president of the Missouri Iron Company, St. Louis, Mo. Dr. Phillips is director of the Bureau of Economic Geology and Technology, University of Texas, Austin, Texas.

water loss in drying the 338.69 tons of ore would be as follows:

Free water	38.37 tons
Combined water	29.46 tons
Total water loss.....	67.83 tons

This loss, subtracted from the total weight of the ore received, would give 270.86 tons of dry material put through the process. The actual amount of dry but not calcined ore sent to the crusher was 267.32 tons. The difference of 3.54 tons is not considerable, but in the calculations the weight of 267.32 tons is taken. The composition of this dry ore was as follows:

	Per cent.
Iron	42.36
Silica	26.80
Alumina	9.89
Sulphur	0.003
Phosphorus	0.085

FINES CARRY LESS IRON THAN COARSER ORE

In order to examine into the nature of this material with reference to the percentage of iron in the several sizes on different screens, I took what appeared to be an average of the material and screened it on 1-in., $\frac{1}{2}$ -in., $\frac{1}{4}$ -in. and 1-20-in. screens. It would appear from the analyses that the coarser stuff carries a great deal more iron than the fine stuff. Attention should be called to the close agreement between the analysis of the material through a 1-20-in. screen, and the analysis of a sample of rejects through a 1-16-in. screen, in regular operation, as follows:

	Iron, per cent.
Through a 1/20-in. screen.....	21.10
Rejects through 1/16-in. screen.....	21.99

The tendency, as also shown in experiments with the brown ores of Alabama, is for the fine material to carry a good deal less iron than the coarser stuff. The point is of considerable importance in connection with the use of the Goltra process, in which the fine stuff is removed by the fan.

Comparing, now, the general average of the analyses of the dry ore, with the general average of the analyses of the raw ore, we have:

Comparison of Raw Ore and Dry Ore

	Raw ore, per cent.	Dry ore, per cent.
Iron	32.74	42.36
Silica	26.77	26.80
Alumina	6.65	9.89
Sulphur	0.041	0.003
Phosphorus	0.075	0.085

The iron is increased by 32.44 per cent.; the silica remains practically the same; the sulphur is practically eliminated and the phosphorus is increased by 14.29 per cent.

The composition of the calcined ore, excluding magnetic concentrates, was as follows:

	Per cent.
Iron	55.23
Silica	14.80
Alumina	10.43
Sulphur	Trace
Phosphorus	0.098

RAW ORE AND CALCINED ORE

Comparing the composition of this (the finished product), excluding magnetic concentrates, with that of the raw ore, we have:

	Raw ore, per cent.	Calcined ore, excluding mag. conc., per cent.
Iron	32.74	55.23
Silica	26.77	14.80
Alumina	6.65	10.43
Sulphur	0.041	Trace
Phosphorus	0.075	0.098

The iron is increased by 68.69 per cent.; the silica is decreased by 44.71 per cent.; the alumina is increased by 56.84 per cent.; the sulphur is eliminated and the phosphorus is increased by 30.66 per cent.

The meaning of these figures is that a comparatively worthless material, the raw ore, is changed into an excellent product, well adapted for blast-furnace use.

The mere statement of the composition of the calcined ore does not convey the full sense of its merits. Its physical qualities, especially the porosity so essential for easy reduction in the furnace, are of equal if not greater importance. It would seem to be practically impossible to take a raw brown ore of similar character and make from it a better product than this calcined ore. In quantity it comprises 22.22 per cent. of the dried ore and 38.76 per cent. of the material from the calciner, which is to be classed as ore.

BALANCE SHEET FOR ORE RECEIVED AT WAUKON

The 267.32 tons of dry ore sent to the crusher are accounted for as follows:

Ore Recovered—	Tons
a. $\frac{1}{2}$ in. and over, loading bin.....	60.40 (not magnetic)
b. Magnetic heads from separator, partly mixed with $\frac{1}{2}$ in. and over.....	11.75
c. Magnetic heads, $\frac{1}{2}$ in. to $\frac{1}{4}$ in.....	1.41
d. Magnetic tails	10.80
e. $\frac{1}{2}$ in. and under, unfinished.....	55.80
f. Clean up at separator building.....	9.16
g. Leakage at reducer feed.....	6.25
	155.57 (58.19%)
Loss—	
h. Dust from collector.....	1.76
i. Rejects from picker belt above loading bin..	1.68
j. Rejects through 1/16 in. screen.....	71.10
k. Leakage at calciner feed.....	1.80
	76.34 (28.56%)
Estimated Loss—	
Dust thrown into the air, etc.....	35.41 (13.25%)

The account would then stand:

Ore received, tons, dry.....	267.32
Ore recovered and weighed.....	155.57
Loss, weighed	76.34
Loss, estimated	35.41
	267.32

Under the conditions which maintained during this test it is impossible to arrive at a closer statement than the above.

Embodying the results of the detailed analyses of each separation in one general statement, we have:

Dry ore to be accounted for..... 267.32 tons

	Per cent. of dry ore	Per cent. of mate- rial to be classed as ore	Per cent. of iron
Ore recovered—			
a. Size, $\frac{1}{2}$ in. and over, not magnetic.....	22.22	38.76	55.23
b. Magnetic heads, partly over-size..	4.39	7.55	55.23
c. Magnetic heads, $\frac{1}{2}$ - $\frac{1}{4}$ in.....	0.52	0.90	63.33
d. Magnetic tails	4.04	7.00	34.05
e. Unfinished material, $\frac{1}{2}$ in. and under	26.87	35.87	52.36
f. Clean up at separator.....	3.42	5.89	50.00
g. Leakage at reducer feed.....	2.73	4.03	51.58
	58.19	100.00	52.07

HIGHER IRON WITH PHYSICAL IMPROVEMENT

What has been done, therefore, is to take a raw ore containing 32.74 per cent. of iron and bring 46 per cent. of it up to 52 per cent. of iron. Taking the free and combined water as material which has to be removed and which represents no possibilities of concentration, being a detriment to the ore, we have taken a material which in the ground carries 32.74 per cent. of iron, and have brought the iron up to 52 per cent. At the same time the physical nature of the ore has been greatly improved. The loss in weight, during the operation, extending from the ore "bank" to the loading bins at the plant, is 54 per cent., of which 20 per cent. is free and combined water. This leaves 34 per cent., or 115.13

tons of material, a portion of which may be suitable for further concentration.

RESULTS OF THE TEST AS A WHOLE

Looking at this matter from the standpoint of clean ore, it is very satisfactory. The free and combined water are completely removed, the clay is almost completely removed and the physical condition of the finished ore leaves nothing to be desired.

The greatest success is reached in preparing calcined ore over $\frac{1}{2}$ in. in size. This product carries over 55 per cent. of iron and its physical condition is ideal.

Where the process is weak, at present, is in the treatment of the calcined ore through a $\frac{1}{2}$ -in. screen, this material being sent to the "reducer" for magnetization and then to magnetic separators.

While some of the magnetic heads carry 63 per cent. of iron, yet the intermediate products and the tails carry too little iron as chargeable against the cost of concentration.

CONSUMPTION OF FUEL

For drying (and partly calcining) 338.69 tons of raw ore 24,166 lb. of Illinois coal were used, or 71.4 lb. per ton. Making proper deductions for lost time, the average ore fed to the dryer was 37.6 tons per hr., the net running time having been 9 hr. With coal at \$2.78 (delivery price at Waukon), the fuel cost of drying one ton of ore was 9.92c.

For determining the coal consumption for calcining (roasting), I take 193.24 tons of ore fed to the calciner, plus 25.44 tons returned, or a total of 218.6 tons. The coal used on this amount of ore was 23,158 lb., or 211 lb. per ton. The average ore fed to the calciner was 32.6 tons an hr., the total time having been 6.75 hr. The fuel cost of calcining was 29.32c. per ton of ore fed to the calciner. For drying and calcining, the fuel cost was 39.24c. per ton of ore.

With Texas lignite at \$1.20 a ton, delivered, the fuel cost of drying would be 4.89c. per ton and for calcining, 14.77c., or a total of 19.66c. as against 39.24c. at Waukon, with Illinois coal.

VALUE OF THE FINISHED PRODUCT

The finished product obtained by this process is excellently adapted for use in the blast furnace. The free and combined water are completely and the clay, sand, etc., almost completely, removed. The sulphur, except in the case of some magnetic concentrates, is eliminated. The physical nature of the ore is greatly improved, particularly in respect to its porosity and easy reducibility in the blast furnace.

The loss in free and combined water in the ore tested was 20 per cent. From the ore received at Waukon we removed 67.83 tons of water, or 16,279 gallons. Good brown ore, of 47 per cent. iron, as sent to the furnaces in Alabama, will carry 14 per cent. of water (free and combined) per ton of ore and this water goes into the furnace and must be evaporated by the heat within the furnace which otherwise would be used in smelting the stock.

EXPELLING MOISTURE IN FURNACE IS COSTLY

A furnace using 1000 tons of brown ore per day has to evaporate 140 tons (33,600 gallons = 279,888 lb.) of water each day, under the ordinary Alabama practice. Allowing that it requires 970 B. t. u. (some authorities give 965.7) to evaporate one pound of water from and at 212 deg. F., we would have 271,491,360 B. t. u. required to evaporate this quantity of water. We will allow that good coke

carries 14,000 B. t. u. per pound. We have, then, 19,392 lb. of coke required to expel the free and combined water from 1000 tons of brown ore. With coke at \$2.75 per ton, the cost of this service is \$26.66 a day. But one-half of the above amount of water can not be expelled from the ore under a full red heat, so that the actual amount of coke required is considerably in excess of the 19,392 lb., and the fuel cost is proportionately greater.

In the blast furnace aside from reduction, coke has two duties to perform: to melt the charge and keep it melted, and to provide the heat necessary for drying, in the upper part of the furnace, such materials as are not already thoroughly dry. If such material, e.g., brown ore, carries 14 per cent. of free and combined water, as is the rule in Alabama, there will be required at least 9 tons of coke to remove it from 1000 tons of ore. Furthermore, this hot water vapor exercises a corroding effect upon the lining of the hot-blast stoves and necessitates more frequent repairs.

Under such practice there is used the most costly ingredient of furnace charges, the coke, to do what should be done outside of the furnace and with the cheapest fuel. The use of dry and calcined ore renders entirely unnecessary the consumption of a single pound of coke in the furnace for expelling the water from ore. Furthermore, the physical nature of such ore allows of a considerable saving in the amount of coke required to produce a ton of pig iron, so that the economy is two-fold. It may also be remarked that the use of such ore increases the proportion of the higher grades of iron from the furnace.

I have no hesitation in saying that the use of such dried and calcined ore as was obtained from the east Texas brown ore tested at Waukon is to be highly recommended to blast-furnace operators. There should be a decided economy in the amount of coke required to make a ton of pig iron, the furnace should work more smoothly and uniformly and the percentages of the higher grades of iron should show a marked increase.

The formation of an employers' organization under the name of Associated Industries was mentioned in *The Iron Age* of July 16, 1914, page 141. This organization, which was started in Buffalo, N. Y., with 39 charter members, has had a rapid growth, the membership now numbering 310. Its field covers the State of New York and its membership includes some of the largest industrial corporations in the western and central portions of the State. Its headquarters are in the White Building, Buffalo, and the secretary is Mark A. Daly.

The subjects of industrial hygiene, fire prevention, industrial safety and welfare will be discussed by State officials, engineers, safety experts and heads of manufacturing and transportation companies at the Second Industrial Welfare and Economy and Efficiency Conference to be held in Harrisburg, Pa., November 17 to 19. The conference is being held under auspices of the State Department of Labor and Industry and the Engineers' Society of Pennsylvania, and there will be a large safety and general exhibit.

The Universal Machinery Company, 1916 St. Paul avenue, Milwaukee, Wis., on November 4 filed a voluntary petition in bankruptcy in the United States District Court. Liabilities are scheduled at \$59,957.04 and assets at \$68,352.83. The company manufactured a line of gas machinery and motor trucks and some time ago engaged in the production of the Perry Mack air-cooled gasoline engine for motorcycle and cyclecar application. E. C. Devlin is president of the bankrupt concern.

A Material for High Grade Castings

How Oxygen Is Introduced Into Coke Irons Improving the Quality—Comparison with Charcoal Irons—Results of Further Investigations

The "Effect of Oxygen on Cast Iron," by J. E. Johnson, Jr., was the subject of an article in *The Iron Age*, February 19, 1914. It was the greater part of a paper presented by the author before the New York meeting in February of the American Institute of Mining Engineers. In it he gave some new ideas regarding the beneficial effects of the presence of oxygen in pig iron which have created considerable discussion. At the convention in Chicago of the American Foundrymen's Association in September, Mr. Johnson read a paper entitled "A Material for High Grade Castings" in which he not only outlined the main points in the original paper but also discussed data obtained from further investigation and experiment. The major portion of the latter is here reproduced:

HOW THE OXYGEN ACTS

The effect of the oxygen seems to be twofold. First, it closes up the grain of the iron by reducing the graphite from flat flakes to small round balls; second, it changes the form of crystallization of the iron, and seems to prevent, to a very large extent, the tendency of the eutectic to form in flat crystals, and causes it to form a meshlike crystalline structure, which I am sure you will say, from looking at a photomicrograph of it, is necessarily much stronger than the structure of flat crystals. The effect of both these two changes is in the same direction as regards strength. The latter makes the matrix or groundwork structure stronger; the former reduces the number and size of the gashes in that structure made by the graphite.

Leaving for another time and place the explanation of the cause of these results and our many unsuccessful attempts to produce strong iron by different methods of operating the furnace, we may pass at once to the fact that I finally succeeded in developing a method of introducing oxygen into iron after it left the furnace; not in variable, one might say, accidental amounts, as in the case with the best operated charcoal furnaces, but under conditions which prevent the absolute control of the process as to both temperature and chemical composition; so that we can virtually saturate the iron with oxygen for the given conditions. This process is carried out, in part, in the Bessemer converter. The silicon is blown out of one portion of the iron so that the oxygen may be made to enter it, which is impossible if more than a small quantity of silicon be present. Owing to the nature of the reactions in the Bessemer converter, we can remove the silicon virtually without affecting the carbon, or we can, if we desire, reduce the carbon to any desired point. To this blown metal we add pig iron straight from the furnace and thereby restore the silicon of the whole to any desired amount. This does not remove the oxygen if the process is properly controlled. Knowing the composition of the two portions of the mixture and the temperature conditions, you will see that we can make up an iron of the desired composition, just as a druggist fills a prescription, and obtain both the analysis and the properties desired.

As to the properties of the resulting metal, this iron is not intended as a scrap carrier in the ordinary sense of facilitating the use of the largest pos-

sible proportions of the poorest and worst mixed scrap. That requires a softener such as silicon or a certain amount of manganese. Oxygen gives a strength and chilling power, exactly opposite properties to those conferred by silicon, and by manganese in moderation; therefore, it would be, to the highest degree, foolish to add it when the properties they give are required. The fineness of the grain of the iron is remarkable

CHARACTERISTICS OF THE METAL

One of the notable characteristics of this metal is its sensitiveness to chilling influences. The samples have not the faintest sign of a chill as cast, but the iron takes a chill of about $\frac{1}{4}$ in. when cast against an iron chilling surface. A coke iron of this sulphur could not be made to show any chill above 0.85 per cent. silicon, and would not show as much as this iron when cast against a chill plate until it was down to 0.65 or 0.75 per cent. silicon, and then even when cast in sand it would show some chill. As compared with coke iron, therefore, this iron has the advantage that, though quite a wide range of silicon, if cast against a chill, it will chill white and very hard; whereas, if cast in sand it will be gray. This wide range of silicon within which we can obtain the chill desired, is a great advantage, as a slight change of silicon will not throw the product from too much to too little chill. The character of the chill is very different from that of coke iron; instead of being highly crystalline made up of flat highly polished surfaces at right angles to the chilling surface, it is almost non-crystalline and breaks into smooth, rounded surfaces, instead of flat surfaces at sharp angles with one another. The result is to make a very much tougher and more endurable chill, and when used for car wheels, reduces to a minimum the danger of shell-outs.

This difference in crystallization appears to be fundamental, since the presence of oxygen seems to overcome entirely the tendency to form the flat smooth crystals eutectic, and forces the iron to crystallize in a meshwork of interlocking crystals even when the carbon is high. This action is of great importance, because carbide of iron which contains 6.67 per cent. carbon, is the hardest compound of iron and carbon known and is the component of the structure which gives to chilled surfaces their wear-resisting properties, and the more there is of it present the harder the surface. Under furnace conditions it is generally the case that the higher the carbon the lower the oxygen and the more certain the iron is to have the flat, worthless eutectic structure, and to throw most of its carbon into the graphitic condition, destroying the chill. But, by the new process, a high carbon iron can be treated so as to saturate it with oxygen, with almost no reduction of the carbon, and thus secure maximum chill and maximum strength.

It is my opinion that the great value of the cold blast charcoal irons for chilling purposes comes from the fact that the great quantity of fuel present on the hearth in their manufacture tends to make them high in carbon, while the low temperature there enables them to be high in oxygen also; conditions which cannot be realized with any other

method of furnace operation. This has permitted the survival of cold blast charcoal iron until now, in spite of its enormous cost.

COMPARISON WITH CHARCOAL IRONS

The strength of this iron is great, as compared with any coke iron and most charcoal irons, being only equalled by some of the most expensive Eastern charcoal irons. Harry B. Swan, of your committee, has made some test bars from crucible remelts of this iron, and through his kindness I am able to give in the table the results of these tests,

Tests of Standard Charcoal and Oxygenized Coke Iron

Kind of Iron	Combined carbon	Graphitic carbon	Total carbon	Manganese	Phosphorus	Sulphur	Silicon	Transverse test, Actual break-age load	Tensile strength, lb. per sq. in.	Brinell hardness
Eastern	0.72	2.18	2.90	0.45	0.141	0.120	2.95	4,575	34,100	217
Eastern	0.72	2.18	2.90	0.45	0.141	0.120	2.95	5,025	35,300	212
Eastern	0.72	2.18	2.90	0.45	0.141	0.120	2.95	4,425	35,200	...
Eastern	0.72	2.18	2.90	0.45	0.141	0.120	2.95	4,030	36,900	...
J. E. J.	0.83	2.60	3.43	0.26	0.35	0.036	1.07	4,505	34,800	202
J. E. J.	0.83	2.60	3.43	0.26	0.35	0.036	1.07	4,825	33,800	207
J. E. J.	0.83	2.60	3.43	0.26	0.35	0.036	1.07	4,825	34,100	202
J. E. J.	0.83	2.60	3.43	0.26	0.35	0.036	1.07	4,815	33,800	196

Note.—Transverse tests made from 1½-in. round bar, 12-in. centers, as per specifications of American Society for Testing Materials.

as well as the analysis of the iron. You will see from these that we have been able to make, at slight expense, from coke iron, a product which is the equal in strength of the Eastern charcoal irons, which are noted for their high quality and high price.

One of the large wheel manufacturers of the country states that they had found the chilling power also of this iron to be the same as that of one of the famous Eastern charcoal irons. I am advised by Mr. Swan that he also cast some of this iron into cylinders and had found the grain fine and good and that it machined well, although somewhat hard. I would suggest that an iron of this strength will never machine as easily as a weak iron and that whatever difficulty there may be in machining it is attributable to its strength rather than to hardness, in the ordinary sense of that term; or, to put it in another way, if cylinders are to have the strength and wearing qualities which are their first requirements, then a certain kind of hardness is indispensable.

There are some purposes for which carbon is desired to be low; it is commonly considered that a reduction of the carbon is the principal function of the air furnace. We may say, almost with certainty, that this is not altogether true, and that the introduction of oxygen is the principal purpose accomplished by it, although the opposite is commonly supposed to be the case. In any event, by the new process, we can supply iron with the carbon reduced to any desired point, with any silicon required, and with more oxygen than can possibly be introduced under air-furnace conditions; by the use of this material we believe that a metal for malleable castings can be made which can be melted in the cupola and cast direct. You will see, I think, that whatever you may think of the methods of reasoning by which the results were attained, that there is a new material at your service when you wish to produce castings possessing great strength, deep tough chill, close grain, machinability and wearing quality.

Wheelock, Love'oy & Co., high-speed steels, Norway and Swedish iron, forgings and shafting, screw and other steel stock, have moved their Boston offices and warehouse to 128 Sidney street, Cambridge, Mass.

The Southern Pig-Iron Rate Case Revived

WASHINGTON, D. C., November 10, 1914.—A broad basis for a supplemental order of the Interstate Commerce Commission to reduce the rates on pig iron from the Alabama and Tennessee furnaces to practically all points of consumption north, east and west is laid in a complaint which has just been filed by counsel for the Sloss-Sheffield Steel & Iron Company and other producers. The contention is set up that the original petition and the commission's order were broad enough to embrace a number of important carriers that have refused to grant the rates fixed by the commission, and it is insisted that it is within the power of the commission to make a supplemental order that will be binding upon all the carriers in question without the formality of a complete new proceeding. The Southern railroads handling pig iron have also filed a petition requesting the commission to set a date for a hearing to determine the proper division of the new freight rates between the several carriers, and it is expected that the two proceedings will be taken up together.

The commission is in receipt of no information with regard to the reported agreement of certain roads north of the Ohio to protect the rate of \$2.90 from Birmingham to Oakley, Addyston, and other Cincinnati points not originally included in the pig-iron tariff under examination, but it is stated that, in view of the numerous important points in other parts of the country which are not provided for in the supplemental tariff issued pursuant to the commission's order, the pending case will have to take its course, although the routine will be curtailed as much as practicable.

Counsel for the producers draw attention to the fact that several hundred carriers participating under concurrence in the pig-iron tariff attacked in the original complaint were named in that tariff, of which number 16 were selected and made formal parties to the original complaint "as representative of the carriers participating under concurrence in said tariff." It is contended, therefore, that all these carriers were in a proper sense defendants in the original proceeding and should have reduced their rates in accordance with the commission's order.

W. L. C.

Lake Ore Shipments in October

Iron-ore shipments from the Lake Superior region in October totaled 4,242,392 tons, as compared with 6,526,103 tons in October, 1913. This is a decrease of 2,283,711 tons. The following table gives the October and season shipments by ports and the corresponding figures for 1913, all in gross tons:

	October, 1914	October, 1913	To Nov. 1, 1914	To Nov. 1, 1913
Escanaba	421,341	617,119	3,440,992	4,914,342
Marquette	265,861	369,293	1,651,579	2,942,897
Ashland	487,829	497,952	3,229,746	4,056,754
Superior	1,442,216	2,040,651	10,920,469	12,858,975
Duluth	918,144	1,689,427	6,197,043	11,520,153
Two Harbors ...	707,001	1,311,661	5,511,976	9,506,399
	4,242,392	6,526,103	30,951,805	45,799,520

This is a decrease of 14,847,715 tons to November 1, 1914, or 32.42 per cent. from last year. The Duluth percentage to November 1 was 20.02 this year, as compared with 25.15 last year, while the Great Northern dock at Superior shipped 32.93 per cent. of the total against 26.56 per cent. to November 1, 1913. The season shipments will probably approximate 17,500,000 tons less than the total for 1913.

The Steel Corporation and Wage Reductions

Concerning the statement in a Pittsburgh telegram to the daily press that the Steel Corporation had decided to reduce wages January 1, Chairman E. H. Gary said: "The question of reducing the wages of our employees has not been discussed or considered by the directors or officials. If we should be compelled to readjust wages by reason of business conditions, it would be very much to our regret. Our policy is to maintain the highest wages practicable, depending upon conditions. These, of course, we cannot control. I am still hoping for a substantial improvement in business in the near future."

OBITUARY

The Norton Company, Worcester, Mass., has been advised of the death of **GEORGES BOUILLON**, who was killed in the battle of the Aisne, September 26, fighting in the French army. Mr. Bouillon was one of the company's valued men. Formerly with Alfred H. Schütte, Paris, he went with the Norton Company's sales department several years ago, and had been instrumental in building up its large grinding-wheel business in France. He had made several trips to the United States where he had formed warm relations. He leaves a widowed mother.

FREDERICK LLEWELLYN GOSS, inventor of the printing press which bears his name, and vice-president of the Goss Printing Press Company, Chicago, died November 10, at his home in that city, aged 72 years. He was born in Newport, Wales, and came to the United States while a young man, living first in Milwaukee and then in Chicago. With his brother he organized the company to manufacture his presses. He leaves his widow and five children.

ADRIAN H. LAZARE, Western advertising representative of the Engineering Magazine, lost his life at Cincinnati, November 2, being caught in an elevator shaft at the Hotel Sinton and drawn from the sixth to the fourth floor. In 1910 and 1911 he was advertising representative of *The Iron Age* in the Central West, and he was one of the original owners of Industrial Engineering.

HENRY J. G. MELCHER, for the last 15 years treasurer of the W. J. Rainey coke interests, 527 Fifth avenue, New York City, died suddenly November 10 at his place of business, aged 57 years. He was born in Cleveland, Ohio, and had been connected with W. J. Rainey for 30 years, starting as a clerk. He leaves his widow, two daughters, and a son.

W. S. HERMANY, constructing engineer, with the Bethlehem Steel Company, died at Bethlehem, Pa., November 7, from typhoid fever. He had direct charge of the erecting of the plant which the company is building at New Castle, Del., for the manufacture of fuses and projectiles. He died on his twenty-fifth wedding anniversary, leaving his widow.

HENRY H. BOGGS, for about eight years manager of the Detroit branch of the Strong, Carlisle & Hammond Company, Cleveland, Ohio, machinery dealer, died November 1, from the shock resulting from an operation, aged 47 years. He had been connected with the company for about 16 years.

DAVID PORTER SANDERS, builder of the first Pullman sleeping car, died November 9, aged 77 years, at Lancaster, Pa., to which city he removed six years ago from Wilmington, Del. For years he was manager of the factory of Harlin & Hollingsworth, car builders, Wilmington.

HANS G. RASMUSSEN, president Badger Foundry Company, Racine, Wis., died November 10 from injuries received in an automobile accident near Watford, Wis., last week. The accident is supposed to have been caused by a defective steering gear.

HENRY A. AINSWORTH, president of Williams, White & Co., manufacturers of machinery, Moline, Ill., died October 9, aged 81 years. He was also president of the Moline Trust & Savings Bank. He leaves his widow.

CHARLES T. ALLEN, Battle Creek, Mich., founder of the American and Union Steam Pump companies of that city, and president of the Riteway Mfg. Company, died October 31, aged 67 years.

The prohibition of exports from Germany has been extended to cover various raw materials, of which the following may be mentioned: Neutral phosphate of calcium, basic slag, iron and steel sheets, copper bars, aluminum, tin, lead and nickel, or alloys from those metals, manganese ore and nickel ore.

Philadelphia Foundrymen's Association

At the meeting of the Philadelphia Foundrymen's Association, held at the Manufacturers' Club, in that city, Wednesday evening, November 4, the nominating committee, consisting of C. D. Matthews, John Alexander and H. M. Thum, presented the names of the following persons for re-election: President, Thomas Devlin, Thomas Devlin Mfg. Company; vice-president, August A. Miller; treasurer, Josiah Thompson, J. Thompson & Co.; secretary, Howard Evans, J. W. Paxson Company; executive committee—Walter Wood, R. D. Wood & Co.; Thomas M. Eynon, Eynon-Evans Mfg. Company; H. L. Haldeman, Pulaski Iron Company; Walter T. MacDonald, Schaum & Uhlinger, and Walter S. Bickley, Penn Steel Casting & Machine Company; trustees—Thomas Devlin, Josiah Thompson and Howard Evans; official chemist, George C. Davis.

The report of the treasurer showed the association to be in flourishing financial condition, there being a substantial balance on hand and all outstanding bills paid.

The paper for the evening's discussion, "Where Are the Profits?" was read by A. G. Dean, West Chester, Pa., formerly secretary of the Cincinnati Foundrymen's Association. Mr. Dean treated his subject from the standpoints of a proper system of cost finding and the maintenance of profitable selling prices. In discussing selling prices he recommended greater cooperation among foundrymen. There is a great tendency to undersell owing to the lack of an adequate cost system. In the foundry trade cost-keeping methods admit of considerable variation, but the preparation of weekly, monthly and yearly averages would go a long way toward eliminating profitless selling.

In the discussion of the paper it developed that foundrymen are using a variety of cost systems, but that the employment of cost-keeping machinery is steadily growing. Cooperative measures have been adopted by some foundries with success, the amount of profitless business having been reduced by the dissemination of authentic information as to costs and the best means of arriving at them.

Further Decrease in Steel Corporation Orders

The United States Steel Corporation's statement of unfilled orders on its books October 31 shows a total of 3,461,097 tons, as compared with 3,787,667 tons on September 30. This is a decrease of 326,570 tons for the month, which is not so large as that of September which was 425,664 tons. On October 31, 1913, the unfilled orders were 4,513,767 tons. The following is a statement of unfilled tonnage for each month beginning with the high point of December 31, 1912:

October 31, 1914...	3,461,097	October 31, 1913...	4,513,767
September 30, 1914...	3,787,667	September 30, 1913...	5,003,785
August 31, 1914...	4,213,331	August 31, 1913...	5,223,468
July 31, 1914...	4,158,589	July 31, 1913...	5,399,356
June 30, 1914...	4,032,857	June 30, 1913...	5,807,317
May 31, 1914...	3,998,186	May 31, 1913...	6,324,322
April 30, 1914...	4,277,068	April 30, 1913...	6,978,762
March 31, 1914...	4,653,825	March 31, 1913...	7,468,956
February 28, 1914...	5,026,440	February 28, 1913...	7,656,714
January 31, 1914...	4,613,680	January 31, 1913...	7,827,368
December 31, 1913...	4,282,108	December 31, 1912...	7,932,164
November 30, 1913...	4,396,347		

Lackawanna Company's Railroad May Extend

Purchase of the Buffalo & Susquehanna Railroad by the interests controlling both the South Buffalo Railroad and the Lackawanna Steel Company is a probable outcome of the ruling handed down by the Interstate Commerce Commission last week with reference to industrial railroads. The effect of this decision is to constitute the South Buffalo Railroad a common carrier with interstate traffic privileges and as a result it will permit that railroad to acquire the Buffalo-Wellsville branch of the Buffalo & Susquehanna Railroad which the controlling interests of the South Buffalo company have had in contemplation since it was announced that the Buffalo-Wellsville branch was to be abandoned. The acquisition of this branch, which is 30 miles in length, would enable the Lackawanna Steel Company to receive coal and coke from its Pennsylvania mines and ovens with a comparatively long haul over its own line.

PERSONAL

William L. Saunders, president Ingersoll-Rand Company, has been nominated for president of the American Institute of Mining Engineers, for the year beginning with the annual meeting of the institute, to be held in New York City February 15-18, 1915. The nominations for vice-president are as follows: Sidney J. Jennings, consulting engineer, New York City, renominated, and Philip N. Moore, St. Louis. The nominations for directors are Samuel A. Taylor, consulting engineer, Pittsburgh; Capt. Robert W. Hunt, Chicago, renominated; Hennen Jennings, consulting engineer, Washington, D. C.; George C. Stone, chief engineer New Jersey Zinc Company, New York City, renominated, and W. H. Aldridge, New York City.

Arthur E. Woolsey, who has been in India for the past three years, having charge of the starting and later the operation of the Tata Iron & Steel Company's works, is expected to arrive in New York this week. Mr. Woolsey reports that the Tata Works is now on a firm footing, and that the operation has been profitable from the beginning.

T. Cohen, of T. Cohen & Co., Ltd., iron and steel merchants, Spencer House, South Place, London, E. C., recently arrived in New York to get in touch with exporters desiring to do business in Europe.

Alfred G. Place has been appointed chief electrician at the works of the Youngstown Sheet & Tube Company, Youngstown, Ohio, succeeding O. R. Jones, recently resigned.

Warren R. Gillard has resigned as chemist of the Pittsburgh Testing Laboratory, Pittsburgh, to accept the position of research chemist with the Pittsburgh Plate Glass Company.

Edwin H. Haslam, engineer for Mackintosh, Hemphill & Co., Pittsburgh, builders of engines and rolling-mill equipment, has gone to England on business.

Herman Schneider, dean of the College of Engineering, University of Cincinnati, has accepted an appointment in an advisory capacity to the Board of Education of New York City, in establishing a co-operative course of education in the high schools of that city. He will devote one week of each month to this work, the remaining three weeks to be spent in Cincinnati. He introduced and perfected the co-operative engineering course at the University of Cincinnati, which has been adopted by other educational institutions throughout the country.

George F. Atkinson, formerly president of the Modern Machine Tool Company, Cincinnati, Ohio, has accepted a position with the Steinle Machine Company, Madison, Wis.

J. Vipond Davies, vice-president of Jacobs & Davies, Inc., consulting engineers, New York, has been awarded by the Institution of Civil Engineers, London, England, the Telford Gold Medal of that institution for his paper on the "Extensions of the Hudson River Tunnels of the Hudson & Manhattan Railroad."

Peter J. Weber, for the last four years city chemist of Milwaukee, Wis., has resigned to assume active management as president of the American Metal Products Company, bronze die castings, 3009 Lisbon avenue, Milwaukee.

W. S. Chase, general sales manager of the National-Acme Mfg. Company, Cleveland, Ohio, has gone to England, where he will spend several months in the interests of his company.

E. St. Elmo Lewis, vice-president and general manager of the Art Metal Construction Company, Jamestown, N. Y., has been elected a member of the board of directors of the Art Metal Construction Company, Ltd., London, England.

Ralph H. Wilson, who has been with the Walter A. Zelnicker Supply Company, St. Louis, about two years, first as assistant to A. R. Topping and latterly representing the company in the Southeast, has been ap-

pointed advertising manager. His recent position will be filled by E. F. Prichard, formerly auditor of the St. Louis Car Company.

Charles F. Lansing has joined the sales force of the American Oil Pump & Tank Company, Cincinnati, Ohio. His territory includes a portion of southern Indiana.

Harold V. Coes, until recently associated with Lockwood, Greene & Co., Boston, Mass., as special principal assistant, has become affiliated with the Sentinel Automatic Gas Appliance Company, New Haven, Conn., as vice-president and general manager.

Recent committee appointments of the American Society of Mechanical Engineers are as follows: H. P. Fairfield, instructor Worcester Polytechnic Institute, Worcester, Mass., H. M. Lucas, Lucas Machine Tool Company, Cleveland, and R. E. Flanders, Jones & Lamson Machine Company, Springfield, Vt., added to the machine shop practice committee. Henry B. Sargent, Sargent & Co., chairman of the New Haven committee. David Bell, engineer, Buffalo Foundry & Machine Company, chairman of the Buffalo committee. John H. Barr, consulting engineer, Remington Typewriter Company, New York City, chairman of a new committee on "Promotion of Industrial Workers." Walter H. Adams, professor of mechanical engineering, Throop Polytechnic Institute, Pasadena, Cal., chairman of the Los Angeles committee.

John E. Sweet, president Straight Line Engine Company, Syracuse, N. Y., is to be awarded the John Fritz Medal this year, probably on the evening of December 2, in the Engineering Societies Building, New York City. The medal is awarded annually by four national engineering societies, for notable scientific or industrial achievements. Previous awards have been made to Lord Kelvin, George Westinghouse, Alexander Graham Bell, Thomas A. Edison, Charles T. Porter, Alfred Noble, Sir William H. White and Capt. Robert W. Hunt.

Robert Wuest, formerly commissioner of the National Metal Trades Association, who recently arrived home from an extended tour through Europe, has returned to Cleveland, Ohio, and, after a few weeks in that city, plans to go to the South for the winter.

J. M. Keller, formerly chief engineer of the William Tod Company, Youngstown, Ohio, and more recently occupying a similar position with the Otis Steel Company, Cleveland, has been appointed chief engineer of the National Carbon Company, Cleveland, Ohio.

Louis R. Steurer has been appointed assistant to J. L. Replogle, vice-president and general manager of sales for the Cambria Steel Company, now located at Philadelphia. Harry G. Uphouse, formerly assistant to Mr. Replogle, when he was stationed at Johnstown, Pa., has been appointed sales agent in charge of the Johnstown district.

H. C. Hequembourg has resigned as general purchasing agent of the American Locomotive Company, effective November 15, 1914. It is not the intention to appoint a successor at this time. Until further notice the purchasing and storekeeping departments will be under the jurisdiction of Leigh Best, vice-president.

John H. Smythe, formerly boiler expert for the Parkesburg Iron Company, has entered the service of the Lukens Iron & Steel Company, Coatesville, Pa. In his new position he will devote his attention to the railroad work of the Lukens Company and also to the interest of the Jacobs-Shupert firebox, which is one of that company's specialties.

John A. Schroeder, formerly general sales manager of the Hyatt Roller Bearing Company, 1120 Michigan avenue, Chicago, has resigned, his resignation taking effect immediately. There will be no other change in the personnel of the organization.

Frank A. Randall and William H. Warner have opened an office for the practice of civil and structural engineering under the firm name of Randall & Warner, 511 Rector Building, 79 West Monroe street, Chicago.

Census Schedules for Machinery and Engines

WASHINGTON, D. C., November 10, 1914.—As the result of the recent publication in *The Iron Age* of the tentative schedules of the 1914 census of the iron and steel industries of the United States, together with a request for suggestions for modifications or additions, the Census Bureau has received a large number of communications, many of which have contained recommendations of real value. Among the most important of these have been suggestions from various branches of the machinery trade that the general schedules of the industry should be supplemented with special schedules covering machinery and engines, and after full consideration Chief Statistician Stuart has prepared these schedules which are reproduced below for examination by manufacturers who are requested to advise the bureau immediately of any amendments that may seem desirable.

Obviously, it is not practicable to include in these schedules, especially that devoted to machinery, a complete list of the various machines manufactured in the United States for use in the thousand and one industries conducted in this country, but the classification is believed to be fairly comprehensive and the publication of the results of the assembled schedules will certainly furnish much valuable information not heretofore obtainable.

The Census Bureau desires especially to impress upon all producers to whom these schedules are to be sent that all returns made thereon will be treated as strictly confidential and that no publication will be made of individual operations or statistics from which such operations can be deduced. All figures are consolidated before publication and the returns from any city, State, or other geographical subdivision in which less than four establishments are located are grouped under the head of "all other" cities, States, etc., or "all other industries." Following are the schedules for machinery and engines:

MACHINERY

1. Products: Give the selling value or price at the factory and account for all products and by-products manufactured during the year (whether sold or not).

The total value of products in this schedule must agree with the total in the General Schedule.

Kind	Value
Adding and calculating machines	\$....
Air-compressing machinery	\$....
Brewers' machinery	\$....
Brick, pottery and other clay-working machinery	\$....
Cash registers	\$....
Parts of	\$....
Cotton gins	\$....
Dairy machinery and apparatus:	
Cream separators	\$....
All other	\$....
Elevators and elevator machinery	\$....
Flour and grist mill machinery	\$....
Glass machinery	\$....
Laundry machinery:	
Power machines	\$....
All other	\$....
Lawn mowers	\$....
Machine tools (machines which employ a tool for working on metal):	
Operated by other than hand power	\$....
Operated by hand power	\$....
Metal-working machinery, other than machine tools	\$....
Meters, gas and water	\$....
Mining machinery	\$....
Oil-well machinery	\$....
Oil-mill machinery	\$....
Paper and pulp mill machinery	\$....
Printing presses	\$....
Pumps and pumping machinery	\$....
Refrigerating machinery (including ice-making machinery)	\$....
Sewing machines	\$....
Shoe machinery	\$....
Sugar-mill machinery	\$....
Textile machinery	\$....
Typesetting machines, linotype and other	\$....
Typewriting machines	\$....
Windmills	\$....

Woodworking machinery:

Sawmill machinery	\$....
All other	\$....
All other machinery, and parts, and machine-shop products (specify kind)	\$....
All other products	\$....

Total

2. Remarks:

ENGINES

1. Products: Give for each class of machines (a) total number and indicated horsepower capacity; (b) number grouped according to indicated horsepower capacity; (c) selling value or price at the works, and account for all products and by-products manufactured during the year (whether sold or not).

The total value of products in this schedule must agree with the total in the General Schedule.

Kind	Number	Number—By indicated horsepower capacity—		Value
		Indicated horsepower	Rated or normal, not overload	
Steam engines:				
Stationary (including portable)				\$....
Marine				\$....
Traction				\$....
Automobile				\$....
Marine turbines				\$....
Stationary turbines				\$....
Other (state kind)				\$....
Internal combustion:				
Gas—stationary				\$....
Gasoline, petroleum, alcohol, etc. (state kind of fuel):				
Automobile				\$....
Marine				\$....
Traction				\$....
Stationary (including portable)				\$....
Other (state kind, aeroplane, etc.)				\$....
Other powers:				
Water wheels, motors and turbines				\$....
Hydraulic rams				\$....
Other (state kind)				\$....
Total				\$....
Locomotives (not to include traction engines):				
Steam	Number			\$....
Electric	Number			\$....
Parts of engines				\$....
Other foundry and machine shop products				\$....
All other products				\$....
Aggregate				\$....

2. Remarks:

Under the heading "Number—By indicated horsepower capacity—rated or normal, not overload," in the above schedule covering engines the Census Bureau will provide separate columns to be filled up with the number of engines under 10 horsepower, from 10 to 50, from 50 to 100, from 100 to 500, from 500 to 1,000, and over 1,000.

W. L. C.

The Fundicion de Fierro y de Acero de Monterey, which is better known by the name of the Monterey Iron & Steel Works, Monterey, Mexico, says a local correspondent, has been forced to curtail its operations by a strike of several hundred of its employees. The company had matured plans for operating all of its departments full time when the labor troubles arose. The plant came through the revolutionary troubles in good shape. For a considerable time much difficulty was experienced in obtaining iron ore and coke because of the bad condition of the local railroads. It is stated, however, that as soon as the labor troubles are settled the plant will be placed in full operation. There is a large demand for steel rails to reconstruct the long stretches of track that have been destroyed and it is further expected that an unprecedented demand for structural steel will develop as soon as the peace of the country is completely restored.

Pittsburgh and Nearby Districts

The annual dinner of the Chamber of Commerce of Youngstown, Ohio, will be held in the Hotel Ohio in that city on the evening of November 16. James A. Farrell, president United States Steel Corporation, is to deliver an address on "The Importance of Further Developing Our Export Trade." F. D. Underwood, president Erie Railroad Company, will speak on "Some Railroad Problems." This is expected to be the most notable dinner yet held by the organization, of which J. G. Butler, Jr., is president.

The Massillon Electric & Gas Company, Massillon, Ohio, is issuing \$75,000 in one year 6 per cent. collateral trust notes, to provide part of \$100,000 required for increasing its equipment in order that it may supply power to the works of the Central Steel Company and the American Stamping & Enameling Company, both now under construction.

The plant of the Valley Mold & Foundry Company, Sharpsville, Pa., maker of ingot molds, which has been down for several weeks, on account of lack of orders, is again in operation.

The Maxicon Products Company, Erie, Pa., capitalized at \$450,000, successor to the Ferro-Krete Company, whose plant in Meadville, Pa., was recently damaged by fire, has taken a plant in Erie, Pa., in which it is installing machinery for the manufacture of a concrete hardener. It will use iron and steel filings in large quantities in the manufacture of its product.

The Pittsburgh Plate Glass Company will move its plant from Belgium to Clarksburg, W. Va., and build a factory to cost about \$1,000,000. The Belgium plant was practically put out of commission by the war.

Frank Bauer, Clinton Kemp and others will open a garage and machine shop in Follansbee, W. Va.

It is reported that the Pennsylvania Railroad Company will build shops costing \$2,000,000 at Wellsville, Ohio.

The C. R. & J. I. Phillips Company, Mannington, W. Va., has been incorporated with \$10,000 capital stock to manufacture motor vehicles.

The Builders' Specialty Company, Huntington, W. Va., has been incorporated with \$25,000 capital stock to manufacture building material.

The Clarksburg Glass Company, Clarksburg, W. Va., will rebuild its plant recently destroyed by fire.

The Champion Tool Company, Meadville, Pa., has received an order for 100 sets of steel blacksmithing tools of nine tools each for the French Government.

A Cincinnati Tool Manufacturer's Views

Henry Dreses, president Dreses Machine Tool Company, Cincinnati, Ohio, an experienced machine-tool manufacturer and exporter, has returned from a several months' business trip to Europe. While declining to express any general opinion as to the outcome and length of the present war in Europe, Mr. Dreses states his belief that as soon as peace is declared an unprecedented international period of prosperity is bound to ensue that will probably last three or four years. He gave as his reason for this belief that the different industries destroyed by the war would have to be rapidly rebuilt and that manufacturers of this country in practically all lines would profit by the situation that would arise.

Mr. Dreses cited an analogous situation that arose after the war between Germany and France in 1870. At that time the United States received a great deal of business from those two countries, although our manufacturers then were not so well organized nor did they possess the close European business connections that they have at the present time. It is his idea that American machinery manufacturers and exporters should watch the situation closely and be prepared to handle business promptly when it is tendered by European customers after the war is ended.

The Lidgerwood Mfg. Company, New York, reports a total of more than 37,000 steam and electric hoists built in the 40 years of its existence.

Commerce Commission Reverses Itself on Industrial Railroads

WASHINGTON, D. C., November 10, 1914.—Industrial railroads which, although primarily facilities of plants engaged in the manufacture of iron and steel and other products, are so organized and operated that the public has the legal right to use them for transportation purposes, may arrange by agreement with trunk line roads for a reasonable compensation for service in the form of switching charges or division of joint rates. This reversal of the sweeping decision of the Interstate Commerce Commission in the so-called Industrial Railroad case, handed down last January, is announced in a supplemental report of the commission just made public and is based upon the recent ruling of the United States Supreme Court in the tap line cases, in which certain plant railroads serving lumber mills and also engaged in more or less non-proprietary transportation, were held to be common carriers and, therefore, entitled to a division of rates with connecting trunk lines. In this last order the commission says: "We shall expect the trunk line roads, under the modification here made of our original findings, to reestablish allowances, divisions, or demurrage or per diem arrangements with industrial roads only in instances in which the transaction is bona fide, and in which it is clearly lawful and proper. Each case must be judged by its own facts and merits. Each of the industrial railroads is or is not a common carrier. If it is a common carrier, it is entitled to all the rights and subject to all of the limitations provided in the act."

In a decision handed down Monday, November 9, the commission held that the Birmingham Southern Railroad, owned by the Tennessee Coal, Iron & Railroad Company, is a common carrier, and therefore that the maximum of 6½ cents a ton on carloads, paid that road by the Alabama, Birmingham & Atlantic before the suspension of the joint tariffs, is not a rebate.

The Adamson Machine Company, Akron, Ohio, has near completion an addition of 80 x 160 ft. to its gray-iron foundry. The extension will be used for a steel foundry. A 2-ton and a 3-ton converter will be installed and steel castings will be made up to 2 tons. A 15-ton Cleveland crane has been installed. The company has acquired an interest in the Akron Steel Castings Company and has taken over that company's business. It will make steel castings for its own requirements and also do a jobbing business.

The Erie Foundry Company, Erie, Pa., recently completed an addition to its machine shop which gives it 40 per cent. more floor space. All the equipment in this addition is now in operation. The company recently took several large contracts for pickling and galvanizing machinery for the Pittsburgh district, also contracts for steam forging hammers and steam drop hammers for plants in the Central West and the Chicago district. Orders now on hand will keep the machine shop running full for about three months.

A Boston dispatch says that an order for a number of submarines has been placed with the Fore River Ship Building Corporation, Quincy, Mass., and that the amount involved is closed to \$10,000,000. It is stated that the submarines are to be turned out as finished sections which will be assembled at destination. The Quincy yard is reported also to have received rush orders on eight submarines for the United States Navy.

The Chamberlin Company, whose work is technical publicity, announces a change of address from 409-410 Free Press Building, Detroit, to 1201-3 Kresge Building. Recently C. W. Brooke, an engineer whose experience includes sales and advertising campaigns, has become secretary and treasurer of the company.

The Hydraulic Pressed Steel Company, Cleveland, Ohio, has taken an order from the Humphreys Company of the same city for pressed steel forms to be used in the erection of 50 to 100 concrete dwelling houses.

The Machinery Markets

Activity resulting directly from the placing of enormous orders for war materials is gradually extending to lines which have not heretofore been favored and the machinery trade at large is much encouraged, while some special lines are busier than they have been in years. In New England some enormous orders have been placed for gun-making machinery and some of the business has been sub-let. Inquiries and orders for shrapnel absorb attention in New York where good sales of machines for making these projectiles have continued. The foreign demand is holding up well in Cleveland, the domestic business in machine tools is slightly improved and the foundries are looking for an early betterment in their line. There have been good bookings on foreign account in Cincinnati and the signs indicate that business has reached the turning point. In Milwaukee the domestic demand is slow, but exports show a betterment. In the Central South conditions do not show much change, but a turn is expected by the end of the year. A slight improvement is reported in the Birmingham territory. The call for pumping and irrigation equipment is fairly good in Texas, but the machinery and tool trade continues dull. Optimism prevails in St. Louis, though no export trade has helped that market. In San Francisco business has felt no stimulus; October sales were small and some doubt is expressed as to the probability of real betterment before the end of the year. In the Pacific Northwest there is a noteworthy demand for irrigating machinery and numerous municipal improvements are expected to bring a betterment in the demand for general equipment, including machine tools.

New York

NEW YORK, November 11, 1914.

Interest continues to center in contracts for shrapnel and the machinery needs of those who receive the orders. Users of miscellaneous machinery are beginning to show a little more life and while business with them cannot be said to be much improved, it is generally admitted that "things are looking better." So far as the railroads are concerned, they are buying but an occasional machine the need of which is urgent. A couple of lists which were put out by Southern railroads several months ago are now practically obsolete.

The Raleigh Iron Works Company, Raleigh, N. C., which was low bidder for 12,000 target projectiles for the United States Navy Department, wishes to receive immediate quotations on high duty, rapid production automatic or semi-automatic lathes and machines for greatest output per machine per hour for four sizes of projectiles and base plugs. The company also wants quotations on copper rotating bands to meet government requirements in the several sizes for the quantities noted and further will require the same quantities of stout canvas and rope grommets made in conformance with Bureau of Ordnance sketch No. 2212, for the four sizes. Prompt delivery is essential with all machines and materials supplied. The sizes and number of projectiles on which the company was low bidder follow:

- 2500—8-in., Bureau of Ordnance drawing 39,384
- 2000—7-in., Bureau of Ordnance drawing 32,508
- 3000—6-in., Bureau of Ordnance drawing 32,786
- 4500—5-in. (50-lb.) Bureau of Ordnance drawing 38,467

It is impossible to say just how much shrapnel business there is in this market, but it unquestionably runs into big figures. The demand which so far has come to notice has been entirely for small-sized shells, almost invariably 3-in. Makers of forging machines have been approached by a number of parties who want machines for forging shrapnel blanks, but a hindrance to business has been the quick delivery wanted. In some cases inquiries have wanted delivery in two weeks, whereas two months would be required to supply the machines and inasmuch as their cost runs into thousands of dollars manufacturers are not inclined to make the machines unless they have satisfactory assurance that they will be purchased and paid for. One inquiry now out for a large quantity of 3-in. shrapnel specifies that they are to be loaded with both explosive and bullets. Only a few companies make shrapnel complete inasmuch as the loading is a delicate operation. The Russian requirement in one case, at least, is that the shells shall be loaded with bullets, the latter surrounded with a resinous compound to hold them in place and a temporary plug inserted in the nose of the projectile; the explosive and firing devices to be placed abroad. A New England company is expected to bring out in the near future a new machine especially designed for making the blanks.

It is pointed out by experts who have investigated carefully, that the making of shrapnel is not the simple mechanical process it appears to be from the foreign drawings, and that much care, precision and labor not always directly specified are necessary to make a product that will pass the rigid inspections and tests which are made. This applies to the shell itself, while the timing and fuse mechanism is as nicely made as a watch. There is much difference of opinion as to the machines and methods best adapted to the work. There

are points of difference in the specifications of all the governments.

The Washington Steel & Ordnance Company, Washington, D. C., has placed an order for nine machines, including Fay automatic lathes and double-spindle turret lathes, with the Jones & Lamson Machine Company and another, for 12 turret lathes with the Gisholt Machine Company. The Watson-Stillman Company has received an order for hydraulic presses to be used in the making of smokeless powder.

Officials of the Fore River Shipbuilding Company were at a New York hotel last week negotiating for the purchase of a number of machines for working plates and structural materials, it is supposed in connection with the orders which the company has received for submarines. Immediate delivery was specified.

A Brooklyn company which has a shrapnel contract and which, it is understood, is to make them complete and ready for the gun, bought over 60 engine lathes, as well as other machines in the last week. Despite the recent heavy purchasing of this type of machine, there are available at the present time more than enough to supply the demand. One dealer has 20, boxed ready for shipment. The Baldwin Locomotive Works, Philadelphia, which has been a good buyer for shipment to Russia, has placed orders in the last week for additional turret lathes.

The Cohen Iron Work Company, 220 Chester street, Brooklyn, N. Y., manufacturer of architectural ironwork, is changing over its shop to electrical drive. It is in the market for a new or second-hand combination punch and shear. A. Cohen is the manager.

The Frederick H. Levey Company, 59 Beekman street, New York City, manufacturer of printing inks, is building an addition to its factory at 222 West Forty-fourth street, two stories, 30 x 90 ft., of brick construction, at a cost of about \$18,000.

R. D. Bush, borough clerk, Manasquan, N. J., will receive bids until November 17 for water and sewer systems.

The new shop of the Lefever Arms Company, Syracuse, N. Y., will be two stories, 38 x 70 ft., and not one story, as has been reported elsewhere. No machinery additions are contemplated.

The Atlantic Marble Company, 241 Bristol street, Brooklyn, N. Y., is having plans prepared for a one-story factory, 40 x 80 ft., to cost about \$5000. It will require a carbondum machine, polishing machine and various other tools. Philip Spina is manager.

The Ford Motor Company, Detroit, Mich., has purchased a site at Main, Rodney and Halbert streets and the New York Central Railroad Belt Line, Buffalo, on which it will erect a four-story reinforced concrete service building with machine shop, etc., to cost about \$450,000.

The Superior Elevator Company, foot of Katherine street, Buffalo, will add a dryer building and a boiler house to cost \$20,000.

The New York & Kentucky Company, Rochester, N. Y., has let contracts for erection at Waterloo, N. Y., of a dryer building and an addition to the boiler house, etc., for the Industrial Distilling Company.

The Rochester Monitor Company, Rochester, N. Y., incorporated by S. A. Thomas, B. D. Straight and J. S. Avery with a capital stock of \$35,000, will erect a machine shop and foundry.

The Empire Concrete Shingle Company, 248 Genesee street, Buffalo, has been incorporated with a capital stock of \$100,000 by W. F. and H. C. Lipp and W. H. Snyder. It will establish a plant for the manufacture of a patented concrete shingle. W. F. Lipp is president.

A committee has been appointed by the chamber of commerce, Syracuse, N. Y., to investigate and recommend the type of freight handling machinery to be installed at the Erie Barge Canal Terminal in that city.

The Union Bag & Paper Company, Hudson Falls, N. Y., is having plans prepared for a paper mill, two stories.

New England

BOSTON, MASS., November 10, 1914.

Europe is placing enormous orders for shrapnel shell in the United States. This means that forge shops are increasingly active; some of the drop forging people are considering contracts of great size, and the pressed metal manufacturers who have the equipment for handling work of this character are equally fortunate. In fact, both forge and pressed metal companies have already booked orders, and the promise is of business of large proportions. Naturally, the machine tool people are already affected by this demand, and the promise is that their share of the business will be large for the forgings and stampings—the latter may also be considered as forgings—must be machined.

Reports of colossal orders for gun-making machinery are going about. It is known that business of this character is under way. The great question of its acceptance is the ability of the machinery makers to take care of it, for they are filled with orders for a long time to come, and have been compelled to distribute some of the requirements among other manufacturers. Sub-contracting on foreign orders is becoming more general in various lines.

Europeans are calling upon their American connections for goods which the latter do not make, but are glad to hand along to those who do. An excellent example of this is an order for a dozen barb-wire machines required by a company interested in wire machinery, but which does not go into this special class of equipment.

Some local business apart from that resulting from the war is reported. For instance, a few planers have been ordered in the week. Ball-bearing sensitive drilling machines are in very good demand, and the manufacturers of automatic turning machines, milling machines, grinding machines, screw machines and other similar types continue to receive orders, chiefly for purposes having to do with munitions of war.

The report comes from various sources that the Winchester Repeating Arms Company, New Haven, Conn., has plans completed for an important addition, which will be built if negotiations are completed for a large number of guns for foreign shipment.

The Androscoggin Foundry Company, Auburn, Me., of which George W. McFadden is the proprietor, will erect a foundry building at a cost of \$50,000.

The Thames Dyeing & Bleaching Company, Uncasville, near Norwich, Conn., will build an addition, 50 x 150 ft., one story, of brick and steel.

The Wade Mfg. Company, Brockton, Mass., is soon to begin the erection of a large fireproof factory.

The Riverside Pulp Mills, Skowhegan, Me., has started the construction of a plant, which will replace one destroyed by fire in the summer.

The Richard Young Company, Peabody, Mass., has purchased the A. B. Clark Mfg. Company property and proposes to enlarge and occupy it.

The A. G. Spalding & Bros. Mfg. Company, Chicopee Falls, Mass., iron founder and manufacturer of sporting goods, has begun work on addition, the erection of which was put off when war started. The present increase in business has impelled the company to provide for larger capacity immediately.

The Trunton Gas Company, Taunton, Mass., has begun improvements to its plant which will entail the expenditure of \$200,000.

Philadelphia

PHILADELPHIA, PA., November 9, 1914.

The Samuel J. Cresswell Iron Works, Twenty-third and Cherry streets, Philadelphia, Pa., founder and machinist, suffered considerable loss from fire November 9.

Wagner & Meyerly, Huntingdon, Pa., are building a three-story garage, 50 x 80 ft., of brick construction.

The contract has been awarded for a one and two-story foundry for the Waynesboro Iron Works, Waynesboro, Pa., to cost about \$60,000. G. T. Eames, engineer, Monadnock Building, Chicago, Ill., is the architect.

E. A. Crosta, 10 South Tennessee avenue, Atlantic City, N. J., has been awarded the contract for the construction of a one-story pumping station, 40 x 50 ft., to cost about \$6000, for Margate City, N. J. W. H. Bartlett, Bartlett Building, Atlantic City, is the architect.

It is currently reported that the Bethlehem Steel Company, South Bethlehem, Pa., has purchased 50 acres of land at New Castle, Del., as a site for a projectile factory.

S. P. Stevenson, Chester, Pa., is receiving bids for a one-story machine shop, 95 x 180 ft.

Edward L. Bader, Atlantic City, N. J., has been awarded the contract for the construction of a sewage disposal plant for Plainfield, North Plainfield and Dunellen, N. J., and is in the market for two centrifugal pumps direct-connected to motors, pipe and fittings. M. B. Markland is manager.

The board of awards, Baltimore, Md., will receive bids until November 18 for a heating system for the filtration plant and pumping station.

Chicago

CHICAGO, ILL., November 9, 1914.

The Justrite Mfg. Company, Clinton and Van Buren streets, Chicago, manufacturer of hardware specialties, will not build its proposed plant at Southport and Hawthorne avenues until next summer.

The Lamke Mfg. Company, Chicago, has been incorporated with a capital stock of \$2500 to manufacture and deal in hardware, advertising specialties, etc. L. A. and J. Lamke and F. S. Schooler, 38 South Dearborn street, are the incorporators.

The Adams Motor & Mfg. Company, Chicago, has been incorporated by Warrington E. Adams, Harold W. Beaton and T. J. Mullen, 29 South LaSalle street, with a capital stock of \$25,000 to manufacture and deal in railroad motor cars, gasoline and electric driven cars, etc.

The Zip Mfg. Company, Chicago, has been incorporated with a capital stock of \$4000 to manufacture and deal in electric and mechanical machinery. The incorporators are A. E. Icely, 72 West Adams street; C. E. Graves and J. P. Folsom.

Frank D. Chase, engineer, Peoples Gas Building, Chicago, is preparing plans for a malleable iron foundry, 70 x 340 ft., of brick and steel construction, for erection at Hammond, Ind., and an annealing building, 80 x 160 ft., etc.

The Ilg Electric Ventilating Company, 154 Whiting street, Chicago, has arranged to lease a building to be erected on Whiting street, adjoining its present location. The new building will be a seven-story factory of heavy mill construction, affording nearly 75,000 sq. ft. of floor space.

R. Schuessler, 3449 Ogden avenue, is building a one-story garage, 57 x 80 ft., at a cost of \$6500.

The Edwards Mfg. Company, 2128 West Forty-ninth place, Chicago, has filed notice of a change of name and hereafter will be known as the Edwards Valve & Mfg. Company.

The Playford Mfg. Company, Elgin, Ill., has been incorporated with a capital stock of \$100,000 by S. P. Playford, E. H. Warren and Frank Bodenschatz.

The Anna Machine Shop & Garage Company, Anna, Ill., has been incorporated with a capital stock of \$15,000 by R. W. and J. P. Hynes and H. W. Smith.

The Illinois Simplex Ventilating Company, Carrollton, Ill., has been incorporated with a capital stock of \$6000 by N. D. Yedder, G. F. Hutchens and E. Z. Curnutt.

The Hegeler Zinc Company, Danville, Ill., has been incorporated with a capital stock of \$500,000 to manufacture zinc and zinc products. The incorporators are D. K. Jones, Richard Yates Hoffman and Paul B. Fischer.

The Moline Muffler Company, Moline, Ill., has been incorporated with a capital stock of \$10,000 by Ray P. Upton, A. C. Walker and E. D. Jones.

The Northwestern Mfg. Company, Orcutt Building, Sioux City, Iowa, has been incorporated with a capital stock of \$50,000 and has purchased the Northwestern Distributing Company, manufacturer of cement block and brick-making machines, power tampers, etc. H. K. Hansen is president and manager.

A fire at Greeley, Iowa, destroyed the municipal electric lighting plant.

Sioux Falls, N. D., has voted \$135,000 worth of bonds for the extension of its water system.

Indianapolis

INDIANAPOLIS, IND., November 9, 1914.

Fire destroyed the plant of the White Frost Ice & Storage Company, Anderson, Ind., entailing a loss of about \$60,000. The machinery in the plant was entirely destroyed.

The Dickinson Tire & Machine Company, Indianapolis, has been incorporated with \$1,000,000 capital stock to manufacture automobile tires and machinery for making the fabric, etc. The directors are M. B. O'Connor, J. R. Smith and H. H. Hornbrook.

The Producers Ground Lime Stone Company has been incorporated here with \$50,000 capital stock to mine and manufacture limestone, etc. The directors are Wm. H. Dye, A. L. Dye and H. S. Cone.

The Guernsey Clay Company, Indianapolis, has been incorporated by P. M. Murphy, H. K. Murphy and H. A. Penton with \$25,000 capital stock to manufacture clay products.

The Eclipse Mfg. Company, Indianapolis, has been incorporated with \$50,000 capital stock to manufacture automobile accessories. The directors are Willis S. Brown, Jr., J. M. Franklin, and others.

The Cummings Box Company, Indianapolis, has been incorporated with \$10,000 capital stock to manufacture boxes. The directors are M. E., G. P. and M. P. Cummings.

The Studebaker Corporation, South Bend, Ind., has closed large contracts for wagons, harness and other equipment for European governments. These will keep a force of 1500 men at work several months.

The Auburn Automobile Company, Auburn, Ind., has reduced its capital stock from \$750,000 to \$250,000.

The Sweet Adding-Listing Machine Company, Evansville, Ind., has been incorporated with \$500,000 capital stock by W. J. Rodgers, M. S. Whitley and W. S. Titus.

The Hammond Malleable Iron Company, Hammond, Ind., has been incorporated with \$75,000 capital stock to do a general foundry and manufacturing business. The directors are H. J. Wanner, H. C. and R. H. Wanner.

Cleveland

CLEVELAND, OHIO, November 9, 1914.

The foreign demand for automatic machinery is holding up well. A Cleveland builder has just taken, in addition to some small orders for shipment abroad, an order for 29 automatics. While the ultimate destination of these machines has not been definitely announced it is believed that they will go to Russia. Some good inquiries for automatic machines from England are now pending. The domestic demand is improved slightly. Local machine tool dealers also report some improvement in orders. These are mostly for small single tools for garages and repair shops, although some lots of three or four good sized machines have been brought for tool room purposes. Among new inquiries is one for about a dozen machines. Large orders placed for export with the knitting mills in Cleveland and elsewhere are expected to stimulate the demand for textile machinery. Business in the rubber tire industry is generally dull, but two Akron makers are reported to have received large orders for export. The local jobbing foundry situation shows little change, but more inquiries are coming out for castings and foundry men are looking for an improvement.

Contracts for the mechanical equipment for the new city hall, Cleveland, will be placed shortly. The George A. Fuller Company is the general contractor for the interior work and has placed a sub-contract with the Chafer Company, Cleveland, for the heating and ventilating apparatus.

The Johnston & Jennings Company, Cleveland, will enlarge its forge department and engage in the manufacture of heavy machine forgings. It has just placed an order with the Erie Foundry Company, Erie, Pa., for three steam hammers, one 2000-lb., one 2500-lb. and one 3500-lb.

The Cleveland Welding & Machine Company, Cleveland, will enlarge its plant by the erection of an extension, 75 x 156 ft., to be used for assembling and warehouse purposes. If any machinery is required, it will be entirely of a special nature. The company's plant has been well filled with work recently, having received some good business as a result of the placing of large orders with American makers for motor trucks for shipment abroad.

The Compton-Price Piano Company, Coshocton, Ohio, has commenced the erection of an addition to its plant.

Through the efforts of the Findlay Business Men's Association, Findlay, Ohio, the recently organized Toledo-Ford Tire Company will establish a plant in that city for the manufacture of automobile tires.

Cincinnati

CINCINNATI, OHIO, November 9, 1914.

Interest continues to be centered in export business that is coming in from Europe. As far as machine tools are concerned, lathes are still in the lead, although a few milling machines have been ordered lately. One shaper manufacturer also reports the receipt of a small order from England. As a rule manufacturers are loath to give out any information as to orders received, and doubtless there has been much more business booked since the war began than the general public realizes. In a number of instances inflated reports have been circulated, but careful investigation has proved that many of these were not without some foundation in fact. Among the latest reports afloat is one concerning an order for approximately 1,000,000 wire cutters, placed with an Ohio manufacturer by English and French importers. These pliers are all to be furnished with insulated handles.

As to domestic business, manufacturers in this territory practically all agree that the turning point has been reached. This optimistic feeling is due, in no small degree, to the allaying of the suspense naturally incident to the national election of last week. Signs of improvement in all lines of business are more evident. While the remaining seven weeks of the year constitute too short a period to expect enough fill-in orders to even up the extremely dull spots of the year, the total business of nearly all manufacturers bids fair to make a much better showing than was expected some six weeks ago.

The American Tool Works Company, Cincinnati, has purchased the plant of the I. & E. Greenwald Company, former engine manufacturer, located at Pearl street and Eggleston avenue. No information is available as to what use will be made of it.

It is reported that the Cincinnati Metal Refining Company, Cincinnati, intends to erect a plant on a site recently acquired in West End.

Emil F. Bullerdick, Cincinnati, has acquired a site on Beekman street, on which he will erect a factory for the manufacture of mattresses.

The new assembling plant of the Ford Motor Company, Lincoln avenue, Cincinnati, is nearing completion, and the work of installing the necessary machinery will begin at an early date.

The Cincinnati Steel Products Company, Erkenbrecker and Railroad avenues, Cincinnati, recently incorporated with \$15,000 capital stock, has equipped a factory for the manufacture of steel specialties. All equipment has been purchased.

An unconfirmed report is circulated to the effect that the Cincinnati Pump Company, Cincinnati, is contemplating moving its plant to Middletown, Ohio.

The Kelly Motor Truck Company, Springfield, Ohio, has let contract for two additional one-story buildings, 60 x 100 ft. and 50 x 250 ft., respectively, of brick and steel construction.

Wellsville, Ohio, has had plans prepared for an electric lighting plant, and will soon ask for bids covering the machinery.

The building committee of Clark County, Springfield, Ohio, will receive bids until 4 p.m., November 16 for installing a deep well pump for the county infirmary.

Purviance Brothers, Canton, Miss., operators of an automobile repair shop, are inquiring in this market for a second-hand lathe. It is presumed that one having a 12-in. or 14-in. swing is required.

The wood-working plant of the John Rouzer Company, Dayton, Ohio, was recently partially destroyed by fire with a loss of \$10,000. The company has already commenced refitting the damaged portion of the plant.

The Nolte Brass Company, Springfield, Ohio, has let the contract for an addition to its plant, 20 x 90 ft., two stories, of brick construction.

Detroit

DETROIT, MICH., November 9, 1914.

The Kelley Chair Company, Grand Rapids, Mich., will establish a branch plant at Hancock, Mich. It is stated that the equipment has already been provided for.

The Ottawa Leather Company, Grand Haven, Mich., is enlarging its plant by the erection of two buildings. One, to be 30 x 100 ft., will be used as a finishing room; and the other, 60 x 64 ft., as a japanning shop.

The Grand Rapids Bread Company, Grand Rapids, Mich., has been incorporated with \$50,000 capital stock by H. C. Bryant, O. E. Rasmus and E. B. Desenberg. It has acquired a factory and considerable equipment will be installed.

The Holland Furnace Company, Holland, Mich., will erect an addition to its plant, 90 x 100 ft., two stories, and will install additional equipment.

The Clark Engine & Boiler Company, Kalamazoo, Mich., will add a motor manufacturing department. Equipment will be added as the business demands.

The Seator Machine Mfg. Company, manufacturer of automatic bread wrappers, Battle Creek, Mich., will equip its plant with new machinery after January 1. James G. Redner is general manager.

The Enterprise Brass Works, Muskegon, Mich., will not erect a plant, as has been reported. A local factory may be purchased.

The General Spring & Wire Company, 212 Jefferson avenue, Detroit, Mich., recently incorporated, is operating a small factory at 932 Mack avenue, Detroit. It intends to add to its equipment from time to time. J. N. Reid is in charge.

Milwaukee

MILWAUKEE, WIS., November 9, 1914.

Manufacturers and business men find much encouragement in the result of the Wisconsin and national elections, which show a turn in the trend of recent years to harass and restrict legitimate business by legislation. As to actual conditions, the past week shows nothing of note; and the machinery trade has not shown any improvement. Machine-tool builders are doing more shipping than for some time, but report the domestic demand very slow, the feature of their business being the somewhat improved demand for export. Municipal work continues to be the bulk of the demand for electrical and waterworks equipment. There is nothing big in sight, at least not until after January 1.

The Cornell Wood Products Company, Cornell, Wis., will purchase a traveling crane for the addition to its factory. It will also be in the market April 1 next for additional equipment not yet listed. H. C. Frisbie is plant engineer.

C. T. Smith, Beloit, Wis., has organized the Best-Ever Aluminum Ware Company and established a kitchen utensil factory on a small scale at Beloit. At present ten men are employed.

Hall Brothers, Manitowoc, Wis., have broken ground for a garage at Ninth and Commercial streets, to be of brick and concrete construction, 50 x 110 ft., one story, to cost \$10,000.

The Burnox Company, 6324 Greenfield avenue, Milwaukee, Wis., has not been organized to do a general manufacturing and repairing business, as has been stated, but will manufacture a carbon remover for gasoline engines.

The Glidden Mfg. Company, Glidden, Wis., will rebuild its electric light and power plant at once; but it is not likely that the stove and heading mill will be rebuilt. The plant was almost totally destroyed by fire several weeks ago with a loss of \$30,000. The power plant served the village of Glidden and private consumers with current. Thomas Keefe is manager.

The Gold Medal Camp Furniture Company, Racine, Wis., is preparing to replace several brick and frame buildings with modern factories of brick, steel and concrete.

The Dells Paper & Pulp Company, Eau Claire, Wis., will increase its boiler capacity and is erecting a 24 x 38 ft. addition to the boiler house.

The Cigar Box Lumber & Mfg. Company, Sheboygan, Wis., has purchased a site 135 x 670 ft. for its proposed plant. Plans have been completed by C. F. Ringer & Son, architects, Milwaukee, for a two-story factory, 60 x 140 ft.; a power house, 35 x 50 ft.; a dry kiln, 35 x 60 ft., and a two-story storage house. Work will begin late this month.

The Prairie du Sac Mill & Light Company has turned over its plant to the city of Prairie du Sac, Wis., and it will be operated under municipal ownership hereafter. The price was \$5000. The city intends to make some improvements.

The Manitowoc Boiler Works, Manitowoc, Wis., has made an installation of electric welding equipment, and will handle custom work in this line.

J. B. D. Resilient Wheel Mfg. Company, Milwaukee, Wis., has been incorporated with a capital stock of \$15,000 by Peter Lesch, J. B. Deahonorsky, K. Lesch and J. H. Liesenfeldt.

The Bean Spray Pump Company has recently closed negotiations and will locate a factory at Lansing, Mich.

Milwaukee Gas Specialty Company, Milwaukee, Wis., has been incorporated with a capital stock of \$100,000 by H. E. Toelle, C. R. Rix, B. Poss and Benjamin Poss, Wells Building, Milwaukee.

Martin Mohr, Beaver Dam, Wis., is planning to build a garage and repair shop to cost about \$4500.

The West DePere Creamery Company, DePere, Wis., is in the market for a 30-hp. boiler, shafting and other small equipment.

The Central South

LOUISVILLE, KY., November 9, 1914

General business conditions in this section are beginning to improve; but the renewed activity has not yet extended to the machinery business. The prospects are that trade will remain quiet for the next few months, but it is believed that by the first of the year machinery will be moving in good volume. As soon as members of consuming trades realize that their business is improving they will be willing to release the orders for machinery. At present small electric motors and machine tools are the best movers in this market.

G. J. Lampton, N. W. Rowland and L. C. Evans, Louisville, have incorporated the Pneumatic Hub-Tire-Wheel Company, which has taken out a charter in Delaware with \$500,000 capital stock. It controls patents for the manufacture of an automobile wheel, and as soon as organization is completed a factory will be erected. Plans are as yet indefinite.

Laib Brothers, wholesale dealers in plumbing supplies, Louisville, are reported to be planning the erection of a plant for the manufacture of that class of goods. The proposed plant will adjoin the warehouse at Eighteenth street and Magnolia avenue. W. G. Probst is interested and has submitted to the city building plans which include a foundry, enameling department, etc.

The Standard Wall Plaster Company, Louisville, is equipping a plant at Brook and Bloom streets. W. P. Bannon, the general manager, may be addressed.

The American Machine Company, Louisville, has announced a change of name to the American Elevator & Machine Company. It is now specializing in elevator building. Mathew Poschinger is president and T. J. Kirn, superintendent.

The Louisville board of education is contemplating the purchase of power machinery for the use of employed girls who are taught in the continuation school which was recently established. Sam D. Jones, business director, will be in charge of the purchases.

Brooks & Shields, Middletown, Ky., are equipping a machine and general repair shop.

R. B. McGee, Hopkinsville, Ky., has patented a bake-oven, and expects to let a contract for the manufacture of the device, which is chiefly of sheet metal.

Walter Smith, Harlan, Ky., plans to establish a 15-ton ice factory, which will be operated in connection with his bottling plant. A machine of the exhaust steam type will probably be purchased.

The W. G. Duncan Coal Company, Greenfield, Ky., has contracted for all machinery for its proposed shop. C. W. Taylor is manager.

Willis Brothers, Middlesboro, Ky., will purchase additional equipment for their garage repair department. A steam boiler has just been installed.

An electric light plant is to be established at Warsaw, Ky., by a company which is being formed by Lawrenceburg, Ind., interests. The mayor can supply details regarding the letting of the franchise.

The Clay Light & Ice Company, Clay, Ky., plans to purchase a 150-hp. engine, a 50-kw. generator, etc. Used machinery will be given the preference. C. R. Clark is manager.

The South Covington & Cincinnati Street Railway Company, Covington, Ky., will purchase two 1500-kw. rotary converters, six 525-kw. transformers, two switchboards and other equipment.

Roy P. Smith, Clarksville, Tenn., will establish an automobile garage and repair shop.

The Holston Tile Company, McCloud, Tenn., has been organized with a capital stock of \$35,000 for the manufacture of brick and drain tile.

The Tennessee Power Company, Chattanooga, Tenn., has secured water rights in Georgia, and is reported to have plans for the development of water power. Two dams and power plants will probably be erected.

The Nashville Railway & Light Company, Nashville, Tenn., plans the installation of a 500-kw. motor generator set.

J. W. Little, Paducah, Ky., who operates a spoke factory will manufacture farm wagons and will require some metal-working machinery.

Newport, Tenn., has voted \$5000 of bonds for increasing the capacity of the pumping plant, etc.

The Knoxville Lumber & Mfg. Company, Knoxville, Tenn., silo manufacturer, has purchased a site for a plant to be completed March 1. Eugene Gaylon is president.

Birmingham

BIRMINGHAM, ALA., November 9, 1914.

With a slight increase in the volume of money distributed through cotton marketing, the demand for machinery used in agricultural sections has improved, although it is not near normal. Small gasoline engines are the best sellers. Machine tools for mines are fairly active. Engines and boilers are going mostly into factories where replacement has become necessary. The general betterment is slight.

A charter has been issued to the Lauderdale Power Company, Huntsville, Ala., which is preparing to develop hydroelectric power on the Tennessee River. Solon Jacobs, Birmingham, is president.

The Alabama Packing Company, Birmingham, will enlarge its packing plant by the installation of a 70-ton refrigerating plant at a cost of \$30,000. Several of the contracts have been let.

W. H. and J. H. Flowers, Jr., Thomasville, Ga., will build a 15-ton refrigerating plant.

The Calcium Stone Company, Dawson, Ga., has been incorporated with a capital stock of \$40,000 by J. F. Gocke and J. A. Horsley, Dawson, and others. It will quarry and crush lime for agricultural purposes.

The Land, Timber & Phosphate Company, Savannah, Ga., has been incorporated by J. W. Motte, W. W. Wilder, and others, with a capital stock of \$100,000.

The Tatum Carbureter Company, Atlanta, Ga., has been incorporated by F. C. Myers, I. I. Tatum, and others, with a capital stock of \$100,000.

The Tampa Hydrostone & Mfg. Company, Tampa, Fla., has been incorporated with a capital stock of \$20,000 and is purchasing machinery to manufacture concrete products. L. L. Roumillat is president.

Marianna, Fla., has voted \$35,000 of water and lighting bonds.

The Cement Roofing Company, Columbia, S. C., will establish a plant for the manufacture of cement tile roofing.

The Tifton Farm Tool & Machine Company, Tifton, Ga., has added three farm implements to its line and will probably double its capacity.

W. F. Googe, chairman of the public water commission, Allendale, S. C., will receive bids until November 18 for complete sewer, electric light and water systems, including an electric light plant and a pumping station.

The Carolina Welding Company, Charlotte, N. C., has been incorporated with a capital stock of \$25,000 by F. H. White, C. M. Setzer and A. C. Butler. It is establishing a plant for welding metals, rubber, etc., and would be pleased to receive data and information as to equipment along these lines. A. C. Butler is manager.

Texas

AUSTIN, TEXAS, November 7, 1914.

A slight increase in the price of cotton is causing a freer movement of that staple and industrial conditions show some signs of improvement. The machinery and tool trade, however, continues dull. The demand for pumping and irrigation machinery is fairly good.

The City Council, Franklin, is preparing to spend \$15,000 on its electric light and waterworks plants.

The Port Arthur Garage, Port Arthur, will build a garage and machine shop.

Robert W. London, Dallas, will construct a 50-ton ice factory.

The Greenville Ice Company, Greenville, will install new machinery in its ice factory.

The Saner-Ragley Lumber Company, Carmona, will construct a lumber mill to have a daily capacity of 125,000 ft. It will be completely equipped with engines, boilers, saws, etc., including an electric power plant. It will also construct an ice plant. Edward Long, Little Rock, Ark., is consulting engineer. Some of the contracts for machinery have already been placed.

The Trems Cartridge Company, Tucson, Ariz., is preparing to construct a factory for manufacturing cartridges. E. C. Crossman is manager.

Plans have been made by Hawe McDuffie, superintendent of the electric light plant at Sherman, for increasing the equipment.

The City Council, Houston, will erect a municipal garage.

L. M. Hewett and associates, who constructed the Bryan & Central Texas Interurban Railroad, are preparing to build an interurban line from Bryan to Navasota. The construction of an electric power plant is proposed.

St. Louis

ST. LOUIS, MO., November 9, 1914.

The machine tool business continues to develop and actual sales are now running about 60 per cent. of normal. So far there has been no export influence upon the market at this point, and little or none is expected until the foreign demand may have exhausted the supplies of tools at other points. The development of new enterprises in this section is at a very low ebb and no extensions are being made. The result is that the present purchases represent only actual needs, and that they are at 60 per cent. of normal conditions is in itself regarded as a favorable situation.

New Haven, Mo., has voted \$10,000 for the equipment of an electric light plant and the improvement of its waterworks.

Troy, Mo., will install a new boiler and other equipment in its electric light plant. D. A. Presley is superintendent.

The Partridge-Scotford Stamp & Stencil Company, Kansas City, Mo., has been incorporated with a capital stock of \$15,000 by E. T. Partridge, S. S. Bevans and H. P. Keusch.

The Booker Lumber Company, East St. Louis, Ill., will increase its mill capacity and change its name to the Booker-Bearden Lumber Company.

The Pacific Refrigerating Company, Pacific, Mo., has been incorporated with a capital stock of \$30,000 by W. A. Powers, J. A. Booth and J. W. Merrill and will establish an ice and cold storage plant.

The Canton Planing Mill Company, Canton, Mo., has been incorporated with a capital stock of \$30,000 by E. M. Carson, W. B. Graves, and others.

The Harrison Ice & Storage Company, Harrison, Ark., has been incorporated with a capital stock of \$25,000 by N. W., W. H. and R. M. Fellows.

A sawmill of about 40,000 ft. daily capacity will be installed at Berryville, Ark., by R. L. Beighten, who is in the market for equipment.

Harrison, Ark., will expend \$30,000 in the purchase and enlargement of the waterworks. The mayor should be addressed.

Tillar, Ark., will equip a waterworks plant. The mayor should be addressed.

The Arkansas Veneer Company, Helena, Ark., has increased its capital stock from \$40,000 to \$75,000.

The Vail Cooperage Company, Lake City, Ark., will equip a cooperage stave mill.

The International Refrigerator Company, Little Rock, Ark., has been incorporated with a capital stock of \$30,000 by B. N. Flickinger, C. A. Sawyer, and others.

The Richland Lumber Company, Lonoke, Ark., has been incorporated with a capital stock of \$25,000 by Alphonse Brewster, W. H. Elsberry, and others.

The Delta Mfg. Company, Stuttgart, Ark., has been incorporated with a capital stock of \$10,000 by local capitalists who will equip a plant for the manufacture of a patented boll-weevil pan.

The mill of the Graysonia-Nashville Lumber Company, Nashville, Ark., has been burned with a loss of \$100,000. The mill equipment will be replaced.

The Thoits-Barton Stave Company, Perry, Ark., will erect a mill and install machinery with a capacity of 10,000 staves daily.

Billings, Okla., has contracted with the Humrickhouse Construction Company, Carmen, Okla., to erect an electric plant and waterworks at a cost of \$21,898.

George A. Johnson, superintendent of the electric light and water systems, Bentonville, Ark., will purchase one 75-kw. generator, etc.

The Mackey Rotary Engine Company, Boley, Okla., has been organized with S. J. King as president. It will equip a \$10,000 plant.

A pipe line with pumping equipment, etc., will be constructed by the Prairie Oil & Gas Company, Independence, Kan.

The Reynolds Oil Burner Company, Ardmore, Okla., has been incorporated with a capital stock of \$15,000 by E. L. Reynolds, R. M. Johnson and W. M. Hutchinson.

The Instantaneous Electric Water Heater Company, Oklahoma City, Okla., has been incorporated with a capital stock of \$10,000 by E. D. Bernstein, J. D. Ratliff and B. J. Lockhart.

Morris, Okla., will receive bids until November 16 for a waterworks plant. The Benham Company, American National Bank Building, Oklahoma City, Okla., is in charge.

Included in the equipment for which bids will be taken at Oklahoma City, Okla., by the State Capitol Commission until December, are sheet metal work, fire doors, ventilating

and heating apparatus, vacuum system, elevators, etc. Layton & Smith, Majestic Building, are the architects in charge.

The City Light & Ice Company, Pryor, Okla., has been incorporated with a capital stock of \$50,000 by G. C. Kissel, Pryor; W. J. O'Brien, Durant, Okla., and J. R. Cullinane, St. Louis, Mo.

The Rapides Electrical Vehicle Company, Alexandria, La., of which W. W. Brown is president, will improve its factory.

Houma, La., which will install a centrifugal pump in its waterworks, will also receive bids for a filtration plant equipment.

L. G. Nichols, Cotton Valley, La., will erect a plant for the manufacture of box shooks, and is in the market for woodworking machinery.

The Tioga Gravel Company, Alexandria, La., is reported in the market for a 24-in. lathe, shaper, drill press, cut-off saw, power fan, air motor drill, etc.

The Southern Lumber & Ice Company, Hattiesburg, Miss., will erect a cold storage plant with a capacity of 1000 tons. M. Canfield is in charge.

The Rosa Lumber Company, Picayune, Miss., will install an 8-ft. band and gang sawmill with 60,000 ft. daily capacity.

The Futvoye-Paterson Company, Shuqulak, Miss., is in the market for a matcher, etc., for a woodworking plant.

The plant of the Western Lumber Company, Logtown, Miss., has been burned with a loss of \$100,000 and its equipment of about \$40,000 worth of machinery will be replaced at once.

Alexandria, La., will receive bids until November 16 for two 2-stage fire pumps, single-stage service pump, surface condenser, vertical submerge type pump for condenser, vertical sewage pump and other equipment. J. C. Raxsdale is the superintendent.

The North Louisiana Shingle Company's plant at Monroe, La., has been burned with a loss of \$15,000. It will be replaced.

Baton Rouge, La., will equip at once an abattoir, the mechanical equipment of which is estimated to cost \$20,000. The mayor is in charge.

San Francisco

SAN FRANCISCO, CAL., November 3, 1914.

The machine-tool trade in this vicinity has felt none of the stimulus apparent in the East. Sales have been extremely small throughout the month of October. A few fairly promising inquiries for special tools are in the market; but most of the business immediately in sight is unimportant. Nearly all other lines of equipment are very quiet. In some cases machinery which has been ordered and delivered is being held subject to further developments. There is, however, a fair and increasing demand for implements, tractors and the like. The general stagnation is attributed in part to the interest taken in the election, and a slight acceleration, at least in the smaller class of business, is expected from now on. In improvements requiring large investment, however, little activity is expected until more money is set free by the inauguration of the reserve bank system and the reopening of Eastern exchanges. It is doubtful whether much buying will be done here before the turn of the year.

The Giant Valve & Mfg. Company, Richmond, Cal., has started work on a factory.

Considerable equipment will probably be required for the construction of the Twin Peaks tunnel, the contract for which has just been let to R. C. Storrie & Co., San Francisco, at \$3,372,000.

The Pressed Steel Wheel Company, Los Angeles, has been incorporated with a capital stock of \$100,000 by J. S. Johnston, G. Bennington, R. T. Payne and C. W. Hubbard.

F. L. Elderly, San Francisco, formerly connected with the United Railroads, is preparing to start a machine shop at Sacramento, Cal.

The plant of the Brisco Iron Works, Lindsay, Cal., which has been closed for the last year will start up shortly under lease to the California Hydraulic & Engineering Supply Company, San Francisco.

The Western Pacific Railway Company's roundhouse and shop at Gerlach, Nev., were destroyed by fire October 30. W. T. Jacobs, Mills Building, San Francisco, is purchasing agent.

Plans are about complete for a machine shop and power house for the civic center, San Francisco. Specifications are also being prepared for an extensive heating plant for the municipal buildings.

The Union Gas Engine Company, San Francisco, has

just completed a 600-hp. engine for a ferry of the Oakland, Antioch & Eastern Railroad.

An order for 22 engines and 11 generators for the pumping stations of the Valley Pipe Line Company, 343 Sansome street, San Francisco, has been placed with the local office of the Allis-Chalmers Company.

W. H. Jahns, Los Angeles, is preparing to enlarge his machine shop.

H. M. Kinslow, Santa Ana, Cal., is fitting up a small machine shop.

The C. L. Best Gas Traction Company, San Leandro, Cal., is getting out a new line of small gas traction engines.

The Pacific Northwest

SEATTLE, WASH., November 3, 1914.

Machinery men here are looking forward to a decided improvement in conditions before long from municipal improvements about to be started. A fair demand for irrigation machinery is noted, and several good-sized orders for mining equipment have been placed recently. Building statistics show about one-third more new construction during the last ten months as compared with the corresponding period of 1913. Bank clearings for this period are slightly under those of the same period last year.

The Carlton Fir Lumber Company, Carlton, Ore., will rebuild its sawmill recently destroyed by fire. The new plant will have a capacity of 200,000 ft. per day, and will represent an expenditure of \$100,000. Charles W. Ladd is president.

W. H. Waidman, Geraldine, Mont., is having plans prepared for a flour and feed mill to cost about \$25,000.

The shingle mill and dry kiln of the Guslander Shingle Company, Olympia, Wash., which was recently destroyed by fire with a loss of about \$6000 will be rebuilt.

The mining properties of L. H. Franch and Charles E. Herron, near Sunrise, Alaska, will be developed in the early spring. The owners plan the installation of two or more electric dredges, and the construction of a power plant.

The Hamilton Cereal & Flour Mill Company, Hamilton, Mont., has been incorporated for \$25,000 by Isaac A. Welk, B. Welk and Jacob Nickel. It plans the erection of a flouring mill.

Clemmens & Bishop, Montesano, Wash., are planning to build two sawmills.

Mitchem Brothers, Spokane, Wash., who have had plans prepared, state that active construction of their packing plant will begin immediately.

The plant of the Perry Shingle Company, Ferndale, Wash., which was destroyed by fire, will be rebuilt.

The plant of the Great Western Sugar Company, Billings, Mont., will be enlarged until the capacity is doubled. Some machinery will be required.

The Cross-Bodine Lumber Company, Seattle, Wash., has been incorporated with a capital stock of \$50,000 by R. M. Cross, A. L. Hill, Portland, and S. R. Bodine, Seattle. Alexander & Bundy, Leary Building, Seattle, are attorneys for the company. It plans the construction of a lumber mill.

The Western Cooperage Company, St. Johns, Ore., will build a stove and banding mill.

The Willamette Pulp & Paper Company, Oregon City, Ore., is not planning or making any additions to its plant, as has been reported elsewhere.

The Morris Mfg. Company, Spokane, Wash., has been incorporated with a capital stock of \$150,000 by Z. A. Morris, D. D. Munroe, V. J. Applegate, R. M. Dunnette and G. G. Ripley. It plans to build an implement factory in the spring.

The Weyerhaeuser Lumber Company, Everett, Wash., will make improvements and extensions to its plant.

The Crown Willamette Paper Company, Oregon City, Ore., will renew its mill equipment.

W. E. Lamm, Danville, Ill., now located at Portland, Ore., will begin the erection of a lumber mill.

The power plant of the New Denver Power Company, New Denver, B. C., destroyed by fire last summer, will be rebuilt.

A subsidiary company of the Stone & Webster Corporation, Boston, Mass., is now being formed to build an electric power plant at Edison, Wash. W. E. Herring, care of the Puget Sound Traction, Light & Power Company, Seattle, has full information.

The Camas Water Company, Camas, Wash., has been incorporated with a capital stock of \$50,000 by O. L. Price, Milton Hegstad, Portland, Ore., and H. L. Sound, Vancouver, B. C. It plans the installation of a water system.

Clyde Park, Mont., has voted a bond issue of \$15,000.

for the installation of a waterworks system. Bids will soon be called.

The Portland Electric Ice Company, Portland, Ore., will make improvements to its plant at a cost of about \$6500. The Eiselguhr Company, Los Angeles, Cal., has been awarded the contract for the work.

The Quenilt Oil Company, 210 National Realty Building, Tacoma, Wash., has been incorporated by W. H. Paulhamus and J. A. Paulhamus, Puyallup, and E. F. Gregory, Tacoma. It will shortly be in the market for electrical machinery.

The Stetson & Post Mill Company, Seattle, has taken a 3-year lease on a mill site held by the port of Seattle.

Eastern Canada

TORONTO, ONT., November 9, 1914.

The Sarnia Sheet Metal Products Company, Ltd., Sarnia, Ont., is reported to be in the market for the purchase of \$10,000 worth of machinery for the manufacture of sheet metal goods. Lloyd Lott is manager. Plans and specifications have been prepared by R. W. Soper, architect, Front street, Sarnia.

Thomas J. Eanson & Co., Pitt street, east, Windsor, Ont., will erect a plant for the manufacture of structural steel, woodwork, etc.

The City Council, London, Ont., will soon invite tenders for two waterwheels, turbine pumps, synchronous motors, etc., for the Springbank pumping station. H. J. Glaubitz, City Hall, London, Ont., is the engineer.

Tenders will close December 1 with the commissioner of the Transcontinental Railway, Ottawa, Ont., for supplying and installing the following plant in the locomotive and car shops at St. Malo, Que.: Boilers and stokers, feed water heater, steam engine or turbines, generators, switchboard and wiring. Plans and specifications are at the office of W. J. Press, mechanical engineer, Ottawa, Ont. B. E. Ryan, Ottawa, is secretary to the commissioner.

Gales' shoe factory on Valier street, Quebec, Que., was destroyed by fire with a loss of \$30,000.

Tenders for synchronous converters with transformers and switch-board panels will be received until November 26 by the chairman of the Toronto electric commissioners, Toronto.

It is understood that the directors of the Quebec Railway, Light, Heat & Power Company, Quebec, Que., have plans under consideration for additions to its power plant.

Simon Buschlen, Port Elgin, Ont., will construct a one-story basketmaking factory. He will purchase basket-making, wood-turning and pulp-making machinery.

The Marine Welding Company of New York, capitalized at \$40,000, has been granted a license to engage in the business of welding steel, iron and other metals and to manufacture welding machinery and appliances. It has appointed William B. McPherson, room 32, 16 King street, west, Toronto, its attorney.

Harry Alexander, Inc., 20 West Thirty-fourth street, New York, has been granted a license in Ontario to manufacture gas, electrical and mechanical light, heat and power traction and transmission apparatus, etc. It is capitalized at \$40,000 and has appointed James M. H. Lindsay, Toronto, its attorney.

The Procter & Gamble Mfg. Company, Citizens' Bank Building, Cincinnati, Ohio, has been incorporated in Ontario with a capital stock of \$100,000 and has appointed John G. Gauld, Hamilton, Ont., its attorney. It is erecting a plant on Burlington street, Hamilton.

The American LaFrance Fire Engine Company, of Canada, Ltd., has been incorporated in Ontario, with a capital stock of \$50,000 and has appointed Alfred Bicknell, Lumaden Building, Toronto, its attorney.

The Lamarre & Compagnie, Limitee, St. Remi, Que., has been incorporated with a capital stock of \$195,000 by Horace, Armand and Fridoline Lamarre, and others, to operate a foundry and factory.

The Watson Carriage Company, Ottawa, Ont., will erect a factory to cost \$14,000.

The electrical plant of Barkey Brothers, Tillsonburg, Ont., was destroyed by fire with a loss of \$10,000.

The Halifax Lumber Company, Ltd., Halifax, N. S., has been incorporated with a capital stock of \$750,000 to manufacture lumber, etc.

Alex. Laforge is contemplating the construction of a factory on Pitt street, West, Windsor, Ont.

The Colonial Player Piano Company, Stratford, Ont., has established a temporary factory and announces that a plant will be erected at South Stratford, Ont.

Extensions will be made to the electric redistribution station, Hull, Que., to cost \$100,000.

Western Canada

WINNIPEG, MAN., November 7, 1914.

Machinery business in western Canada continues to depend chiefly on the outlook for next season. There is a moderate demand for supplies for repairs to plants, but the situation is quiet as regards contracts for new industries. The financial situation is not favorable for manufacturing expansion. Money is now in better circulation in these provinces on account of the marketing of the crop, and that will no doubt to some extent stimulate industrial operations.

Empress, Sask., is preparing to install a waterworks system at a cost of about \$60,000.

The factory of the Stamco of Regina, Ltd., manufacturer of bed springs, mattresses, tents and awnings, Regina, Sask., was damaged by fire a few days ago to the extent of about \$15,000. Some of the damaged machinery will be replaced at once.

The B. C. Copper Company, Ltd., Copper Mountain, B. C., is having plans prepared for a plant capable of treating 1000 tons of ore daily. Mr. Walz is the superintendent.

The Western Canada Cordage Company, Ltd., Calgary, Alberta, has been organized with a capital stock of \$1,000,000. It will commence operations this fall on a factory to be constructed at Manchester, a suburb of Calgary, at an estimated cost of \$150,000.

Work will be started at once near St. Albert Trail on the erection of a sawmill to cost \$20,000 for the Edmonton, Dunvegan & British Columbia Railway, Edmonton, Alberta.

The Well Tool & Iron Works, Ltd., Calgary, Alberta, has been incorporated with a capital stock of \$20,000 to manufacture tools, etc., and to operate an iron foundry.

The Leduc Lumber Company, Ltd., Leduc, Alberta, has been incorporated with a capital stock of \$20,000.

The Clyde Lumber Company, Ltd., Edmonton, Alberta, has been incorporated with a capital stock of \$20,000.

The Klenzo Mfg. Company, Ltd., Lethbridge, Alberta, has been incorporated with a capital stock of \$50,000.

Fire destroyed the sawmill and planing mill of the Forest Mills of British Columbia, Ltd., Comaplix, B. C. The loss is estimated at \$250,000. W. A. Anstie, general manager, announces that the plant will be rebuilt.

Government Purchases

WASHINGTON, D. C., November 9, 1914.

Bids will be received by the Reclamation Service, 605 Federal Building, Los Angeles, Cal., November 17, specification 356-F, for furnishing centrifugal pump impellers for the Minidoka project, Iowa.

The supervising architect, Treasury Department, Washington, will receive sealed proposals until 3 p.m. November 30 for a hydraulic freight lift and pumping plant for Winston-Salem, N. C.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until November 24, schedule 7512, for six 6-in. handy-billy ship's pumps for Norfolk.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until November 24, schedule 7529, one duplex feed pump of 7500-lb. of water per hour capacity, for Brooklyn; schedule 7537, one single spindle drill press for Washington; until December 1, schedule 7538, one electrically-driven engine lathe for Annapolis; schedule 7539, one 2½ or 3-hp. gasoline engine, one 15-in. upright drilling machine, one 10-in. grinding machine, one 10-in. engine lathe, and one 7-in. shaper, all for Philadelphia; schedule 7540, one complete automatic buffing machine for Newport; schedule 7541, one ¾ to 1¼-in. double head bolt cutter, for threading bolts and tapping nuts, for Philadelphia; schedule 7543, one complete belt-driven disk grinder for Brooklyn; schedule 7546, one 14-in. swing geared head engine lathe for Philadelphia; schedule 7562, 15 110-volt, 12-in., 60-cycle single-phase induction fans for Brooklyn; schedule 7564, 10¼-hp. portable ventilating sets for Charleston, S. C.; schedule 7575, eight vertical simplex feed pumps for Brooklyn; until December 8, schedule 7577, two 21-in. x 12-ft. heavy duty engine lathes for Charleston.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, November 3, schedule 7407, class 51, Washington, for five lathe heads, as follows: I. H. Johnson, Jr., \$4036, \$4100 and \$4156; Niles-Bement-Pond Company, \$20,690, \$20,435, \$21,420, \$21,00, \$18,750 and \$19,790, totals.

Trade Publications

Superheater.—R. O. C. Sales Company, 1777 Broadway, New York City. Folder. Describes a superheater for use in connection with all types of liquid fuel for internal combustion engines. The special features of the superheater are that a uniform mixture for all cylinders is obtained and a greater thermal efficiency is secured from the engine. Illustrations of the superheater, showing its construction and installation, are included.

Drawing and Stamping Presses.—Ferracute Machine Company, Bridgeton, N. J. Catalogue No. 20. Relates to a line of heavy drawing and stamping presses for pressures ranging from 50 to 2000 tons. The various presses are illustrated with a brief description under the engraving, a separate page being devoted to each. The presses shown are of both the single and double action type, the latter being of the toggle drawing pattern, in which the blank holder is given a long dwell under pressure while the plunger completes its stroke. A list of work for which these presses are adapted is also presented.

Rivet Machinery.—Grant Mfg. & Machine Company, Bridgeport, Conn. Pamphlet. Treats of rotary rivet spinning machines of the pedestal and bench types, as well as rotary vibrating riveting machines. Illustrations of the different machines are given, together with tables of the principal dimensions and a list of articles riveted by these machines is included. An illustrated description of one of the company's rivet spinning machines appeared in *The Iron Age*, January 29, 1914.

Oil and Gas Burning Appliances.—Quigley Furnace & Foundry Company, Springfield, Mass. Bulletin No. 5. Deals with a line of burners and equipment that has been developed for use in the economical handling and proper burning of oil and gas fuel. The various forms of burners are illustrated and briefly described and mention is also made of fuel oil pumping and blowing systems, and various accessories, such as tank gauges, oil strainers, steam separators, blast gates, pressure gauges, oil storage tanks, etc.

Lock Nut.—Smith Improved Lock Nut Company, Rockford, Ill. Circular. Contains a brief illustrated description of a lock nut for use wherever bolts are subject to severe vibration and strain. The special feature of the nut is that it is made in one piece of steel which is cut to form a helical spring and threaded with the United States standard thread. A number of illustrations of places in which this lock nut is in use are given, together with a partial list of users.

Industrial Railway Equipment.—Easton Car & Construction Company, Easton, Pa. Catalogue No. 508. Describes and illustrates an extensive line of industrial railway equipment, including rails, ties, track fastenings, portable tracks and switches, turntables, wheels and axles and cars of all kinds. Most of the information is given by engravings, although in some cases brief text descriptions are also employed.

Electric Molding Machine Vibrator.—International Electric Tool Company, Milwaukee, Wis. Bulletin No. 51. Treats of an electric vibrator for molding machines and pattern rapping. The special features of the vibrator, which was illustrated in *The Iron Age*, July 16, 1914, are small power consumption, elimination of leakage in the transmission piping and cheap auxiliary apparatus.

Steel Chains and Sprocket Wheels.—Link-Belt Company, Chicago, Ill. Book No. 124. Presents a series of illustrations most of which are approximately full size of various steel chains and attachments that can be furnished. Tables of dimensions of the different chains are included, as well as the sprockets that can be supplied for use with them.

Valves.—Coffin Valve Company, Neponset, Mass. Pamphlet. Presents a condensed description of the company's principal products and includes a sufficient number of tables to make it easy for the purchaser to select a valve to meet his requirements. The various valves covered include sluice gates, gate, flap, check, foot and butterfly valves, all of which are illustrated and briefly described.

Steel Sash.—David Lupton's Sons Company, Allegheny avenue and Janney street, Philadelphia, Pa. Catalogue No. 8, superseding all previous specialty catalogues. Illustrates a very complete line of steel sash that can be supplied in a number of different standard arrangements. Illustrations of the various units that can be furnished and their construction are given, together with a comprehensive description of the construction and views of installations. Mention is also made of a line of steel partitions and steel-tube doors and frames. Rolled steel skylights and sheet metal fireproof windows are briefly touched upon, as well.

Hydraulic Operating Valves.—Schutte & Koerting Company, Philadelphia, Pa. Section H, Catalogue 8; Relates to the Schnicke operating valve for machinery in steel

mills and other manufacturing plants where the pressure employed does not exceed 2000 lb. A description of the construction and operation of the valve, which was illustrated in *The Iron Age*, July 16, 1914, is presented, together with illustrations showing the position of the various operating parts.

Automatic Machine-Tool Controllers.—Cutler-Hammer Mfg. Company, Milwaukee, Wis. Four bulletins. The first, No. 4500, contains a general description of a line of automatic machine-tool controllers for use with about or compound wound direct-current motors adapted for constant or adjustable speed work. The special features claimed for the controllers are increased output and lower production cost, the ability of the foreman to set the control at the proper speed for a job, and the use of dynamic braking. The automatic plain starting type is described in detail in No. 4510, while those of the speed setting type are taken up in No. 4520. With this type of controller, when one speed is fixed by the foreman, it cannot be changed by the operator, who simply has to start and stop the tool. The last bulletin, No. 4530, treats of the speed regulating type. In all of the last three bulletins, views of the controller as applied to machine tools are included, together with dimension tables and diagrams.

Steam Hose and Belting.—Goodyear Tire & Rubber Company, Akron, Ohio. Three booklets. The first is devoted to a line of steam hose that is made with and without arming. Illustrations of the different brands are given in color, and there is a brief description of the uses to which they may be put as well as the materials entering into their construction. The second pamphlet is devoted to Balata belting, for use in various industries. The advantages of this belt are endurance, imperviousness to moisture, smooth running and freedom from stretching. The last pamphlet treats of flat conveyor belts, which are made in various styles, for use where the heat is excessive, the bends are sharp and where heavy, gritty substances have to be transported. The way in which these belts are made is briefly described.

Power Presses.—Walsh Press & Die Company, 4785 West Kinzie street, Chicago, Ill. Collection of circulars. Covers a line of power presses and accessories, which include inclinable power, screw and punch presses, automatic roll feeds and a safety device. There is practically no text in any of the circulars, the story being told almost entirely by engravings of the different machines and appliances. An illustrated description of the safety device appeared in *The Iron Age*, June 25, 1914.

Steam Jacketed Kettles.—Stuart & Peterson Company, Burlington, N. J. Catalogue No. 220. Covers a line of steam jacketed kettles, which are made in a great variety of sizes and shapes. In practically every case one page is devoted to each particular type of kettle, an engraving and table of the sizes in which it can be supplied being presented. A general description of the kettles and instructions for their use are included, and there are illustrations of the various types of stirrers that can be supplied.

Rocking and Dumping Grates.—F. W. Foster & Son Company, 97 Haverhill street, Boston, Mass. Pamphlet. Relates to a line of rocking and dumping grates designed especially for use in power plants where a low grade of fuel or a mixture of coal and some waste product is used. The text description of the grate is supplemented by engravings showing the positions of the bars during the rocking and dumping operations as well as their normal position. Mention is made of a valve for maintaining any desired water level in a tank and a boiler feeder.

Charcoal Iron Boiler Tubes.—Parkesburg Iron Company, Parkesburg, Pa. Catalogue. Treats of the manufacture of charcoal iron boiler and superheater tubes. After a brief historical description of the process of making the iron, which has been practiced for over a century, the general rules and regulations of the Board of Supervising Inspectors and the American Master Mechanics' specifications for charcoal iron boiler tubes are presented. Tables of the standard sizes and weights of the tubes, which are made in the straight and upset types are included. The catalogue is illustrated with numerous views of the plant and the various stages in the process of manufacture.

Automatic Drill Chuck.—Automatic Drill Chuck Corporation, Majestic Building, Detroit, Mich. Pamphlet. Points out the advantages of using the Quiclite automatic chuck in a drilling machine. The principal points about the chuck are that it can be operated by finger pressure without stopping the machine spindle, grips the drill tighter as the load increases and has no exposed teeth or points to catch. Illustrations of some of the chucks are given, together with a sectional drawing, showing the construction. Instructions on the use of the chuck are included. An illustrated description of the chuck appeared in *The Iron Age*, July 16, 1914.

